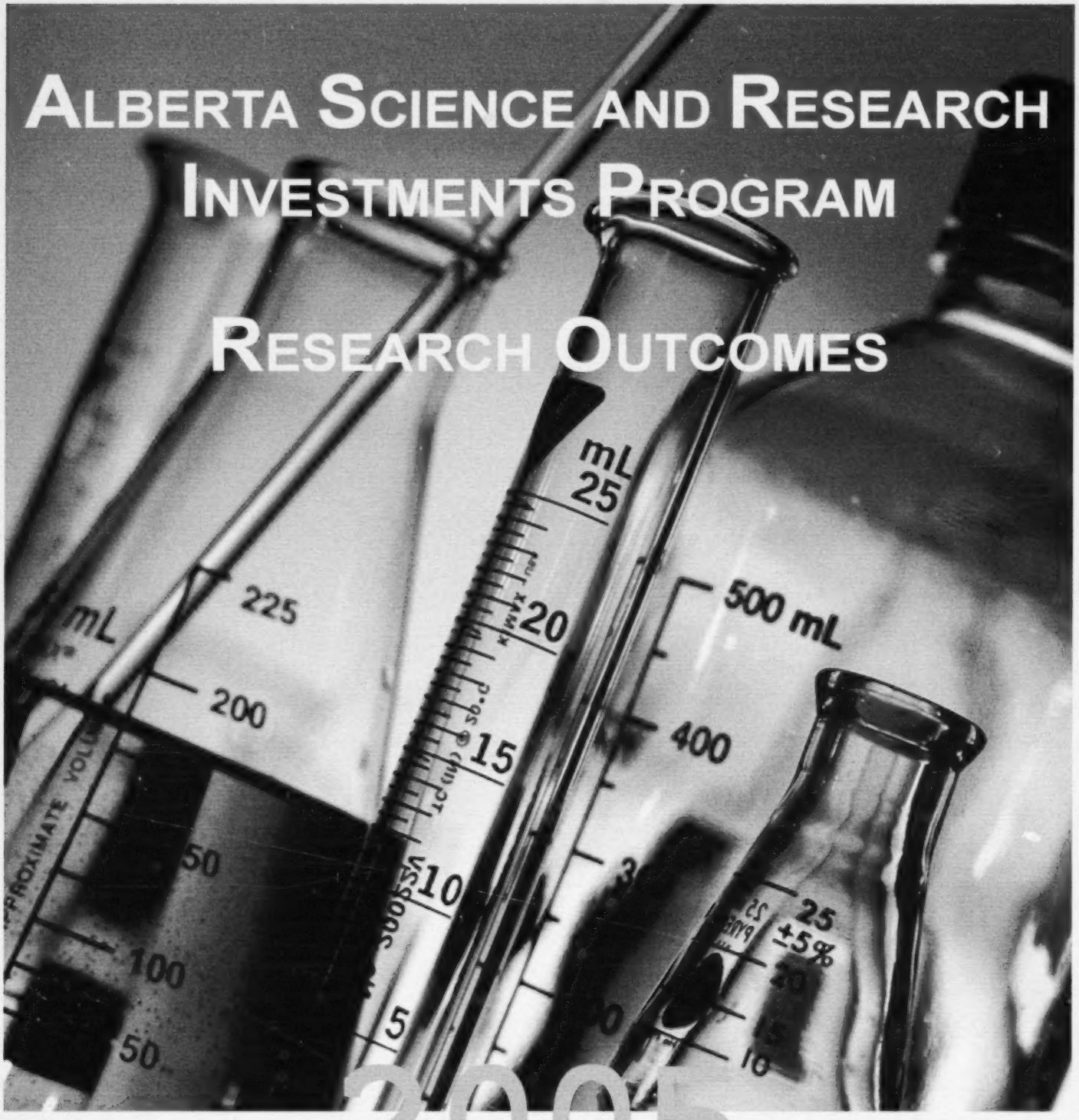
Alberta Science and Research Investments Program

Research Outcomes



2005

Annual Report

January 2006

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Alberta Science and Research Investments Program

2005 Annual Report

Photograph of a real nanomachine, a ratchet actuator. The device is about 50 microns across - for comparison, a human hair is about 100 microns across.

Following on the highlighted projects (pages 2 to 16), this report provides details on ASRIP's competitive process, and a comprehensive listing of projects and strategic investments (pages 17 to 45).

Introduction

The Alberta Science and Research Investments Program (ASRIP) has been an active participant in the funding of research infrastructure at Alberta universities since 1997, first as the Intellectual Infrastructure Partnership Program (IIPP), and then as the ASRIP. The ASRIP and its predecessor funding programs have made considerable investments to strengthen Alberta's research system.

The Alberta Government recognizes that unleashing innovation requires building research capacity and capability. Our goal is to ensure that Alberta's researchers acquire cutting-edge tools and conduct innovative science in world-class centres of excellence.

The ASRIP coordinates with the Alberta Science and Research Authority (ASRA) and with Alberta's research institutes and foundations to ensure that capacity is built within Alberta's strategic research areas and that small and large equipment investments complement other targeted provincial funding.

The ASRIP focuses the investments in the areas of energy, life sciences, and information and communications technology (ICT). Alberta's research system is strategically enhanced and well-positioned to recruit and retain excellent people—the scientists, technicians, graduate students and emerging entrepreneurs that are integral to unleashing innovation.

ASRIP: Research Outcomes

This annual outcomes report highlights selected ASRIP investments that have supported successes in providing world-class research infrastructure, building capacity, recruiting top quality researchers and leveraging research funding. The report also outlines ASRIP's cumulative investments through funding competitions held between 2000 and 2004.

During this period, The ASRIP strategically invested over $93.5 million in 126 key projects that have significantly increased research capacity in Alberta. The total value of these projects was nearly $523 million with the remainder of the funding coming from the federal government, the private sector, and non-Alberta government sources.

As this report illustrates, the ASRIP serves as an important mechanism for leveraging funds from the federal Canada Foundation for Innovation (CFI), the private sector and other sources in order to maximize the research dollars flowing into Alberta.

The Alberta government recognizes that it must invest wisely to compete with other jurisdictions nationally and internationally to effectively build the province's research capacity. The ASRIP is proving to be a integral means to ensuring that the right investments are indeed being made—ones that promise a successful return for our future.

02-055 ***'Studies in the Cause, Prevention and Cure of Type I Diabetes'***

Dr. Ji-Won Yoon, the University of Calgary

Diabetes and its complications are the third leading cause of disease-related death in North America, after heart disease and cancer. Approximately one million people in Canada have diabetes, and 10 percent of them have type 1 diabetes (IDDM), a serious chronic childhood disorder caused by the autoimmune destruction of pancreatic beta cells. Researchers at the University of Calgary's Diabetes and Endocrinology Research Group headed by Dr. Ji-Won Yoon are pursuing a cure for IDDM using novel gene therapy.

Dr. Yoon is recognized worldwide as a top-ranked scientist in the field of research on virus-induced diabetes in animals and humans, and is one of the best known scientists in the field of cell specific autoimmunity leading to type 1 diabetes and the development of methods to prevent the disease.

Curing type 1 diabetes with gene therapy

Dr. Yoon made headlines in 1999 with his discovery of new information on what triggers autoimmune type 1 diabetes in mice and studied the long-term complications of virus-induced diabetes. With the new facilities provided by the ASRIP and other funding sources, the Yoon and his colleagues ultimately hope to cure autoimmune diabetes. Moreover, the production of the construct for the gene therapy will promote economic growth, create jobs in the biotechnology sector and enhance the diversity of the Alberta economy. Curing diabetes will also significantly reduce the cost of health care to Canadians.

Discovering a cure is still in the future, to date the infrastructure has enabled them to design and optimize their construct for gene therapy, which they soon plan on expanding from rodents into non-human primates, bringing them one step closer to their goal. Specifically, the infrastructure has aided the clarification of the molecular mechanisms responsible for virus-induced type 1 diabetes and for the destruction of insulin producing â cells by antigen specific T-cell mediated immune response.

The infrastructure has enriched the training environment of students and post-doctoral fellows by providing access, exposure, and experience with cutting edge technology. In addition, the availability of the infrastructure has promoted recruitment and retention of personnel by providing a competitive, well-equipped research environment.

The new equipment has also fostered collaborations/interactions among researchers and across disciplines by making different technologies available to colleagues without the need to duplicate the purchase of platform equipment such as the Roche LightCycler real-time PCR unit.

The new facilities have significantly built upon Alberta's leading edge in diabetes research, with far reaching implications. The infrastructure has not only sped up research into the development of a gene therapy for the possible cure of diabetes, but it has also been shared with other members of the Julia McFarlane Diabetes Research Centre at the University of Calgary, thus stimulating many different areas of diabetes research in the province of Alberta.

The infrastructure has allowed U of C researchers to improve insulin gene therapy techniques to the point where they can partner with pharmaceutical or biotechnology companies for clinical trials. It is expected that the future production and sale of the gene therapy construct will help stimulate the emerging biotechnology sector in Alberta.

Institution: *University of Calgary*

Lead Scientists: *Dr. Ji-Won Yoon*

Funding Partners: *Canada Foundation for Innovation, Alberta Heritage Foundation for Medical Research, Korea Green Cross Corp, SK-BioPharma R&D, Biotech Institute for International Innovation*

ASRIP Funding: *$136,000*

Total Project Cost: *$374,932*

01-056 ***'Biotelemetry Analysis System: Infrastructure for Cumulative Effects Assessment'***

Understanding why animals use the habitats they do, in the proportions they do, allows scientists to predict how animal distribution will change after habitats are lost or impacted by human activity, and how that change in distribution will affect survival and reproduction.

The Biotelemetry Analysis System is designed to track and record an animal's movements over its home range. The new tool can be applied to a host of species and will adapt to landscapes worldwide. The system combines technology only recently developed in radio telemetry and satellite locations with highly innovative statistical methods and computer techniques that will move wildlife research a quantum leap ahead. The system moves Canada into the forefront of attempts to measure the cumulative effects of human activities on wildlife populations.

With the funds provided by the ASRIP, researchers obtained tracking equipment, aerial remote sensing facilities, field equipment and a spatial analysis system, further enhancing the capabilities of the Natural Resource Management facility at the U of A.

Biotelemetry equipment has improved Alberta's Grizzly bear management

The biotelemetry analysis system has had major consequences for researchers and natural resource managers in Canada. The results of the research have influenced and will continue to influence the approach to industrial development to ensure that it occurs in an environmentally sensitive fashion. Although this sometimes results in costs to industry, more often the results allow modifications to development programs that have less consequence environmentally with minor or no cost to industry.

As a result, the researchers designed new methods for the development and evaluation of resource selection functions for wildlife. These methods have been applied in several projects: (1) grizzly bear habitat selection in the Yellowhead region of Alberta, (2) corridor identification and modeling for grizzly bears and cougars in Crowsnest Pass and Canmore highway routes in the Canadian Rockies, (3) multi-species cumulative effects assessments associated with diamond mining in the Northwest Territories, (4) passerine bird distribution and habitat use in NE Alberta, (5) bison habitats and populations in Wood Buffalo National Park, (6) greater sage-grouse habitats and population viability analysis in SE Alberta, (7) grizzly bear habitat use in the Parsnip River valley of British Columbia, (8) mountain caribou conservation in British Columbia and Alberta, (9) moose habitat selection on the Al-Pac Forest Management Area in NE Alberta, (10) elk movements and habitat use in the central east slopes of Alberta, (11) wolf-elk dynamics in western Alberta, and (12) consequences of industrial development on the population ecology of black bears in NE Alberta.

The biotelemetry analysis system is having important consequences for public policy and environmental decisions related with wildlife and natural resource management. Grizzly bear management in Alberta and British Columbia is being driven by results obtained from the project's investigations.

Institution: *University of Alberta*

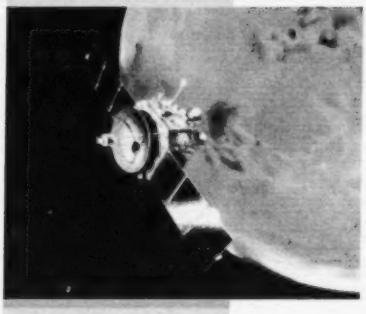
Lead Scientist: *Dr. Mark S. Boyce*

Funding Partners: *Canada Foundation for Innovation, National Science Foundation, Weyerhaeuser Canada, Rocky Mountain Elk Foundation, Alberta Conservation Association, University of Alberta*

ASRIP Funding: *$200,000*

Total Project Cost: *$856,408*

01-112 ***'Advanced Space Instrument Facility (ASIF)'***



Nozomi Spacecraft at Mars

The Advanced Space Instrument Facility (ASIF) at the University of Calgary consists of a combination of expertise and specialized equipment for the design, evaluation and operation of micro-satellites and satellites. The infrastructure supported by the ASRIP has transformed the existing lab into a world-class space science facility, unique in Canada and one of a select few world-wide.

ASIF's design capability includes electro-optical detectors, optical instrumentation, and space plasma instruments. Two major components of the facility are the Vacuum UV Calibration Facility and the Particle Calibration System. The facility occupies an area of about 250 m^2, including adjoining clean rooms and areas for the assembly and testing of space-flight instruments.

U of C's ASIF is now a world-class space science facility

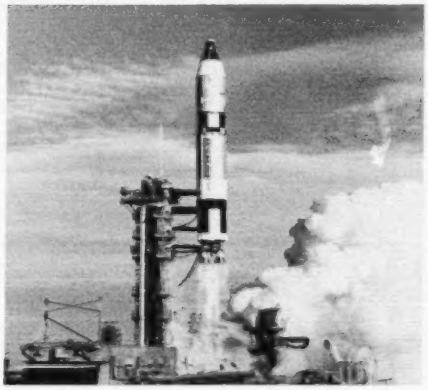
The ASIF is currently supporting the development of two next-generation imagers that will be flown on the Canadian CASSIOPE/e-POP Small Satellite, which will use the first made-in-Canada small satellite platform, an element vital to the future of the Canadian space program.

The e-POP payload will be carried by CASSIOPE. Once launched into orbit in early 2007, e-POP's eight scientific instruments will provide scientists with new data on space storms in the upper atmosphere and their potentially devastating impacts on radio communications, GPS navigation, and other space-based technologies. Space storms (also called solar storms because these disturbances originate from the Sun), generate huge electrical currents in the upper atmosphere's polar regions. The solar storms also produce the aurora borealis, or Northern Lights.

The ASIF is critical to the recruitment of new faculty, post doctoral fellows and graduate students, not only at the University of Calgary, but across Canada at the other 10 universities and research organizations involved in the CASSIOPE/e-POP mission.

The ASIF has had a significant impact on the development of research partnerships with four space and telecommunications research and development companies, including the joint sponsorship of an NSERC Senior Industrial Research Chair (IRC).

The project's principal investigator, Dr. Yau, was the scientific leader of an advanced particle detector on a planetary probe to gather data on the upper atmosphere of Mars. Unfortunately, the Japanese spacecraft Nozomi was lost on the flight to Mars in 2004. The probe, built at the ASIF, was designed to measure low-energy particles and gases considered vital to the understanding of the origin and composition of the Martian atmosphere.



Institution: *University of Calgary*

Lead Scientist: *Dr. Andrew Yau*

Funding Partners: *Canada Foundation for Innovation, Canadian Space Agency, University of Calgary*

ASRIP Funding: *$299,000*

Total Project Cost: *$598,500*

01-050 ***'Molecular Characterization of Cancer Cell Populations by Single Cell and Living Cell Analysis'***

The ASRIP award provided infrastructure for quantitative single cell gene and protein analysis and multi-dimensional time-lapse imaging equipment. The infrastructure has had substantial impact on research excellence within the province of Alberta. The laser micro-dissection and cell manipulation tools have allowed researchers from across campus to study gene expression of specific types of cells in vivo, something that was not possible before.

The infrastructure is located at the Experimental Oncology Cellular Imaging and Genetics Analysis Facilities in the Cross Cancer Institute (CCI). With the new technologies made possible in part by the ASRIP grant, the clinician researchers are helping to determine the alterations in live cells that lead to cancer or to relapse and increasingly aggressive disease. The equipment has allowed them to make major leaps in understanding of heterogeneity in human cancer by isolating individual cells or groups of cells using laser micro dissection as well as to capture and analyze abnormalities in their genes and in their gene expression using the multicapillary DNA Analysis system.

Imaging the cells and identifying the genes that cause cancer

This type of study, coupled with analysis of cancer cells at diagnosis, during progression and remission and after relapse, is allowing researchers to formulate a comprehensive picture of the cancers analyzed. As never before possible, Dr. Pilarski and her group are now correlating the presence of either frequent or rare cancer variant clones with disease outcome, facilitating even more precise studies to design and test therapeutic attack strategies.

The infrastructure has generated unique training opportunities for students, postdoctoral fellows, research associates, and research technologists across the University of Alberta. The infrastructure for computational and quantitative analysis of the properties of 3-D objects and structures has provided a unique local resource that has served both fundamental and translational health research. Collectively, the equipment provides a focal point for research that crosses the many disciplines represented on campus. This has included members of the Department of Biological Sciences who have used these tools to generate 3-D reconstructions of large regions of animal tissues, and the Departments of Medicine and Pathology, who have used the tools to make quantitative measurements of immunofluorescently stained tissue specimens from patients.

Dr. Linda Pilarski, the University of Alberta

The infrastructure has resulted in the employment of at least one additional staff member in each of the research laboratories that participated as applicants or co-applicants. These individuals have acquired skill sets that are becoming increasingly in demand as many experimental research program begin to ask questions that have more immediate impact on the diagnosis and/or treatment of diseases such as cancer.

In total, 25 graduate students and postdoctoral fellows have benefited from the infrastructure and 10 highly qualified personnel were recruited by the availability of the equipment. 112 trainees on this technology have developed unique skills that are in increasing demand, particularly the computational and quantitative analysis of the properties of 3-D objects and structures.

Institution: *University of Alberta, Cross Cancer Institute/ Alberta Cancer Board*

Lead Scientist: *Dr. Linda Pilarski*

Funding Partners: *Alberta Heritage Foundation for Medical Research, Alberta Cancer Board*

ASRIP Funding: *$533,000*

Total Project Cost: *$2,072,780*

01-120 ***'Genetics and Development Biology Laboratories'***

Dr. Sam Weiss, Chair of the Genes and Development Research Group at the U of C's Faculty of Medicine.

Institution: *University of Calgary*

Lead Scientists: *Dr. Sam Weiss*

Funding Partners: *Canada Foundation for Innovation, Alberta Heritage Fund for Medical Research, Heart and Stroke Foundation, Hugo Weiss Memorial Fund*

ASRIP Funding: *$190,000*

Total Project Cost: *$1,035,885*

The facilities provided by the ASRIP, coupled with outstanding researchers will enhance Alberta's efforts in genetics and gene therapy.

Dr. Weiss and his collaborators seek to understand the role that genes play in disease, especially when genes are defective or malfunction. His own research has increased the potential for recovery from brain and spine injuries by showing that brain stem cells exist in all stages of development, from embryo to adult.

The infrastructure greatly enhanced the Genetics and Developmental Biology Laboratories at the University of Calgary with specialized facilities, such as microsurgery, viral gene transfer, and digital imaging. These laboratories and facilities have been constructed to support the research activities of ten principle investigators and over 70 trainees and assistants in the newly established Genes & Development Research Group (GDRG). Their common interest is the use of model systems to examine genes that regulate developmental processes in all multicellular animals, from worms to humans. The infrastructure has had an enormously positive impact on the group and has elevated its stature to a National Centre of Excellence.

New information to help stroke victims with brain-stem cell therapy

Owing to this infrastructure, the GDRG has been able to establish a number of new and innovative approaches to genetics and developmental biology research. For instance, Dr. Weiss and his research team recently discovered that a naturally occurring hormone, prolactin, stimulates growth of brain-stem cells into mature nerve cells.

Future research will reveal whether the hormone could help repair the brains of stroke victims. He is also planning an international collaborative project that involves Bryan Kolb and Ian Wishaw at the Canadian Centre for Behavioural Neuroscience (CCBN) at the University of Lethbridge. Both are eminent in the field of behavioural and restorative neurology.

The infrastructure has also allowed the GDRG to recruit a larger number of highly qualified personnel, by virtue of being able to offer them multi-disciplinary training using state-of-the-art technology. Specifically, the group has recruited three new faculty members over the past four years. Each of these, Drs. James Cross, Carol Schurrmans and Jeb Gaudet, have received salary support from both the Canadian Institutes of Health Research and the Alberta Heritage Foundation for Medical Research.

The new equipment has also allowed the GDRG to recruit and retain a larger number of postdoctoral fellows and research assistants. As well, a greater number of research collaborations have resulted, both within the institution and with other institutions provincially and nationally.

A spin-off biotech company – Stem Cell Therapeutics – has been established, in part through scientific efforts enabled by the infrastructure. Also, two investigators have filed patents on their work in the past three years.

The GDRG's funding has almost doubled from all sources over the past three years. It is reasonable to conclude that this is, at least in part, due to the new infrastructure provided by the ASRIP.

02-047 ***'Infrastructure for Computation, FPGA Programming and Testing for High Capacity Digital Communications Systems Research'***

ASRIP funding was used to build a Field Programmable Gate Arrays (FPGA) -based test environment for high capacity advanced communications systems in the Department of Electrical and Computer Engineering at the University of Alberta. This test equipment is currently being used in field tests to ascertain the capacity potential of using multiple antennas for transmission. The test bed uses a novel timing recovery algorithm and is fully self-synchronized. A matlab visual interface allows control of the test bed and data acquisition for post processing, as well as visual monitoring of test bed functions.

The end result of the infrastructure to-date has been the development of a communications computer chip that uses about 100 times less energy than current chips. This exciting new technology offers promise for many small electronic devices, leading to even smaller cell phones, new ultra-high-speed communications systems, and advances in the use of implantable health care devices such as drug delivery chips.

Researchers have developed a computer chip 100 times more efficient than current chips

The invention employs a new method of processing digital data, known as analog decoding, which uses extremely low levels of power to execute its decoded algorithm. The team's research shows that no other reported chip uses a lower amount of energy consumed per decoded information bit.

The infrastructure provided by the ASRIP has had a positive effect on recruitment. Last year Dr. Stephen Bates joined the University of Alberta from private industry in Ireland. Dr. Bates, an expert in cable-bound transmission systems and protocols, was influenced in his decision to join the Department of Electrical and Computer Engineering at the University of Alberta, partly because of the availability of efficient hardware resources at the High Capacity Digital Communications (HCDC) laboratory.

Training opportunities have been enhanced as a result of the infrastructure. During the last year the laboratory has trained two undergraduate students and two exchange students from Germany.

Dr. Christian Schlegel, left, Dave Nguyen, centre, and Dr. Vincent Gaudet pose with their communications chip.

During the last year collaboration agreements were established with the University of Toronto and the University of Waterloo and a joint project in the area of software radio was conceived, for which they applied for funding. These collaboration links were strongly influenced by their capabilities in the area of FPGA design and testing.

Since the conception of the HCDC laboratory with its focus on implementation of advanced communications algorithm and systems, the laboratory has been approached by three commercial entities about assistance in design and testing of error control coding systems. One research contract has been signed to date, and another contract with a US-based company is undergoing final negotiations. They are also working with a Calgary based company which has shown interest in IP developed with the infrastructure provided by the ASRIP. This is a clear testimony to the effectiveness of this infrastructure support.

Institution: *University of Alberta*

Lead Scientist: *Dr. Christian Schlegel*

Funding Partners: *Canada Foundation for Innovation, University of Alberta*

ASRIP Funding: *$125,000*

Total Project Cost: *$313,465*

300-10-1-27 ***'Innovative Instrumentation for Advanced Proteome Research'***

Dr. Liang Li, University of Alberta.

This project obtained equipment that is essential to develop novel instrumentation for proteomics applications. Proteomics research requires analytical techniques that provide high sensitivity, specificity and sample throughput. Dr. Liang Li and other researchers in the Department of Chemistry at the University of Alberta are developing innovative analytical tools, including microfludics devices, mass spectrometric instruments, and protein imaging techniques, to meet these challenges.

The infrastructure provided by the ASRIP allowed Dr. Liang's group to purchase a state-of-the-art mass spectrometer and two microscopic imaging systems for the characterization of proteins. These instruments have been extensively used for research in Chemistry Department at the University of Alberta. The infrastructure has also made a significant impact in establishing a unique and strong collaboration between the researchers in the Department of Chemistry and those at the Cross Cancer Institute, a centre of cutting edge cancer research. The mass spectrometer, in particular, has become an integral part of the Alberta Cancer Board Proteomics Resource Facility. The infrastructure serves the needs of cancer researchers across the province of Alberta in using proteomics approaches for solving biological questions related to cancer.

The equipment has also been used to analyze over two thousand samples from approximately 40 research groups at the Universities of Alberta and Calgary.

Equipment for earlier detection and treatment of cancer

Many of the related research projects range from basic science in understanding cancer biology to more clinical applications such as biomarker discovery for early cancer diagnosis, and cancer prognosis. The research group continues to provide protein analysis services to these researchers using the ASRIP supported mass spectrometer.

The social and economic benefits of the research include 1) understanding of basic processes related to cancer biology can lead to more efficient design of drug targets which may result in better management and treatment of cancer, 2) searching for biomarkers to provide better diagnosis of a cancer and to develop better treatments by using the biomarkers as indicators of the efficacy of a treatments such as chemotherapy for breast cancer, 3) training high quality researchers which benefits the biotechnology industry in Alberta and in Canada, and 4) discovery of new biomarkers for disease diagnosis which may result in spin-off companies who could commercialize the results of discovery research.

Professor Li's research group consists of 11 graduate students and 7 research associates. Li's lab alone has published over 37 papers in the past four years. There are over 20 papers published by others who have used the infrastructure.

Over $3.5 million in operating funds (2001-2004) have been obtained from the Alberta Cancer Board, Genome Canada, US Army, NSERC, and The Protein Engineering Network of Centres of Excellence.

Institution: *University of Alberta*

Lead Scientist: *Dr. Liang Li*

Funding Partners: *Canada Foundation for Innovation, National Institutes of Health (USA), Institute for Biomolecular Design, MDS Sciex*

ASRIP Funding: *$576,000*

Total Project Cost: *$1,440,115*

01-053 ***'Cardiovascular Gene Therapy Unit (CIGNET)'***

The Vascular Biology Group at the University of Alberta is investigating the physiological processes that occur at the cellular level in the human cardiovascular system. The research considers how these processes lead to the regulation of the heartbeat and blood vessel function in healthy tissue and in some disease states. This will lead to effective treatments for cardiovascular disorders such as heart disease.

In 2001, Dr. Michelakis established the Cardiovascular Ion Channel Gene Therapy Unit (CIGNET) within the Vascular Biology Group at the University of Alberta. Funded by the Canada Foundation for Innovation and the ASRIP, CIGNET uses cutting-edge basic science technologies to determine the role of ion channels in cardiovascular physiology. The goal of the unit is to develop human gene therapies for the treatment of heart disease and other cardiovascular disorders.

Exciting gene therapies for treating heart disease

Gene therapy has great potential to treat a variety of cardiovascular diseases of the heart, lungs, blood vessels and blood. It could also be used one day to help prevent cardiovascular disease from affecting many of the millions of people destined to develop some form of it each year.

Gene therapies rely on the use of "vectors," or transport systems, to introduce new genes into the body. These genes produce therapeutic proteins that replace, augment or alter existing cellular activities to create a healthier environment. Gene therapy effects can be temporary or long-lasting depending on how a particular therapy is designed. Researchers in this field have developed an extensive array of vector systems that can enter different cells. Many of these vectors are viruses that have the natural ability to infect certain cells and deliver their genetic cargo. These viruses are specifically engineered to make them safe for use by medical professionals and their patients.

CIGNET is a multidisciplinary molecular physiology lab focusing on the study of cardiovascular diseases in small animals, at all levels, from the molecular to the whole animal. The unit has a number of cutting edge technologies and the following cores: 1) Hemodynamic Assessment Unit which includes rodent echocardiograpy, a high fidelity in vivo hemodynamic station, and multichannel telemetry (for ECG and pressure recordings) 2) Molecular Biology /Imaging Unit including Laser Capture Microdissection, quantitative RT-PCR, microscopes and image analysis systems 3) Adenoviral Unit dedicated in the creation and propagation of replication deficient adenoviruses used in cardiovascular gene therapy.

Dr. Evangelos Michelakis Director of the U of A Pulmonary Hypertension Program, and CIGNET

During the first 2 years of operation, work performed in CIGNET has resulted in the filling of 2 patents, the training/recruitment of 4 postdoctoral fellows and several graduate students, and more than 15 papers in high impact journals, such as 'Circulation' and 'Circulation Research'.

Institution: *University of Alberta*

Lead Scientist: *Dr. Evangelos Michelakis*

Funding Partners: *Canada Foundation for Innovation, University Hospital Foundation*

ASRIP Funding: *$320,000*

Total Project Cost: *$800,000*

300-10-2-24 ***'Integrated Thermal Characterization Unit'***

Dr. Raj Mehta, University of Calgary

Thermal analysis and chemical characterization are corner stone experimental techniques in energy and environmental technologies. For example, thermal analysis provides scientists with a better understanding of oil reservoirs, helps to reduce leakage in natural gas pipelines, and allows for the possibility of partially upgrading oil while it is still in the ground, (as opposed to after it is brought up and sent to a distant refinery.)

Integrated Thermal Characterization research can aid in reducing fires and explosions while drilling wells. The technology can be used for studying industrial effluents and medical samples. It can even be used to characterize chemicals created by the combustion of solid waste for generating electric power. The Integrated Thermal Characterisation Unit, a unique facility in Canada, supports five major research projects: 1) oil shale processing, 2) underbalanced drilling safety, 3) soil remediation 4) in-situ combustion, and 5) waste energy recovery.

Thermal analysis research facility - the only lab of its kind in the world

The infrastructure provided by the ASRIP and other funds, has helped create and enhance a strong research partnership between the two principal investigators. Both have interests and skills in energy and environmental technologies and their research is complementary, spanning both upstream and downstream processes, and chemical and petroleum engineering.

The infrastructure affords opportunities for multiple collaboration with departmental colleagues in the chemical, oil and gas and environmental research groups. The coupling of integrated thermal analysis instrumentation with a sophisticated suite of gas product analysis equipment is enabling effective and efficient generation of new data and information for these research programs and indeed, future research initiatives.

The project leaders have established international links with a number of Universities, including the Petroleum University of Technology, Iran, University of Kentucky, University of Technology, Sydney, and Murdoch University. In today's climate however, this is through collaborative funding applications or as fee for service contracts. A joint venture in oil and gas research training with the Petroleum University of Technology, Iran is currently in development.

The value of thermal techniques for industry relevant research is currently reflected in requests for utilization by industry and the growing number of industrial projects that require analyses by thermal methods. Currently, over twenty corporations from five different industries work with the laboratory. These industries require the highly qualified personnel with an integrated background in energy and environmental technology. The students and graduates who are being trained with the ASRIP funded infrastructure gain valuable research experience, affording them with many job opportunities in the realted industries.

Institution: *University of Calgary*

Lead Scientists: *Dr. Raj Mehta, Dr. Brent Young*

Funding Partners: *Canada Foundation for Innovation, University of Calgary*

ASRIP Funding: *$190,000*

Total Project Cost: *$376,865*

01-048 ***'Precision Ranching'***

Precision ranching involves innovative research in sustainable landscape and animal management systems. Or as Dr. Mick Price, one of the lead academics on the project, says, "we're trying to use modern electronic communication technology to ensure the right animal is in the right place at the right time."

Understanding the dynamic impacts of grazing on forage grass root growth will greatly improve the cattle industry's potential to enhance the long-term sustainability of grazing in Alberta's aspen parkland. Roots can be seen as a sentinel, giving a warning to when forage production is about to decline. By addressing problems before they are visually obvious aboveground, it is anticipated that the impact of animal grazing on the ecosystem will be reduced.

An area of the University Ranch at Kinsella was cross-fenced into small paddocks to allow a study of mixed-species grazing and GPS collars were purchased to monitor movement of the animals in these paddocks.

Studies to reduce the impact of cattle grazing on the environment

A mini root rhizotron was purchased to allow belowground studies to be conducted over the whole ranch, and a feed monitoring system (GrowSafe) was purchased to allow studies of individual feeding activity in group fed cattle.

Associated 'LIght Detection And Ranging' (LIDAR) mapping of the whole ranch, remote weather stations and computing and communications capability were added to make the entire system operable. The project created a three-dimensional digital model of the University's ranch, mapping out every feature from trees to fences to animals. Details such as topography, vegetation, climate, soils and human factors were measured.

The philosophy behind the project was to set up a research situation where observers can accurately evaluate the full consequences of ranching management decisions.

By enabling cutting edge research to be conducted simultaneously above and below ground the Precision Ranching infrastructure has attracted top level researchers to the Kinsella Ranch site. The infrastructure has provided full time graduate students and summer undergraduate students an opportunity to work on aspects of animal physiology and metabolism, and soil plant inter-relationships.

The study also demonstrated the relationship between ranchers and their animal's grazing environment that have not previously been possible.

The breadth of this research program involved a large number of Principle Investigators coming together to study different aspects of Precision Ranching using this infrastructure. Several new collaborations have resulted in successful grant applications and at least an additional $1 million in research grant applications have been submitted as a result of this initiative.

The GrowSafe based studies have also attracted funding and close co-operation from a commercial cattle breeding company (Beefbooster Cattle Company) in Alberta.

Institution:
University of Alberta

Lead Scientist: *Dr. M.A. Price*

Funding Partners:
Harvie Bequest, Hodgson Endowment, University of Alberta

ASRIP Funding:
$350,000

Total Project Cost:
$849,146

300-10-2-27 ***'Laser Cooling and Imaging of Extremely Low Density Ionic Atoms and Molecules'***

Dr. Robert Thompson, University of Calgary.

With this infrastructure, Dr. Thompson and his research team have joined an elite group of fewer than 10 universities with expertise in the new discipline of Quantum Information Science (QIS). By processing digitized information simultaneously, rather than in a linear stream, quantum information science may be able to increase computing speed exponentially, and profoundly impacting all aspects of computing – from internet security to e-commerce. Today, increases in computing speed rely on information being digitized and exchanged faster and faster in a linear stream of 1s and 0s. However, with quantum computing, the digitized 1s and 0s can be created and processed simultaneously, creating an exponential increase in processing speed. The researchers will focus primarily on experimental and theoretical research with the aim of developing quantum information science, its applications, and high quality personnel to support the growth of this area.

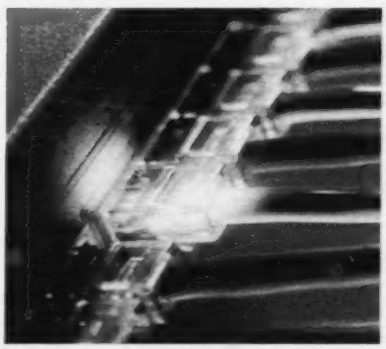
Quantum computing - a big breakthrough in information science

With the ASRIP-funded equipment, Thompson can cool atoms to "absolute zero" - the point at which all motion in matter stops and observe these super-cooled individual ions as they evolve in time. The goal is to use these particles for making sensitive measurement instruments and the structures in computer chips.

The infrastructure aquired by Dr. Thompson, has been a key component in attracting new personnel and students. Dr. Barry Sanders has taken an iCORE Professorship in theoretical QIS and Dr. Alex Lvovsky was recruited from the University of Konstanz in Germany, as a Canada Research Chair nominee in experimental QIS. In 2003-04 alone, 4 M.Sc. students and 3 undergraduate students worked on projects related to this infrastructure.

This experimental work, in conjunction with the work of the group of Dr. David Feder, a top, young cold-atom theorist in the Department of Physics and Astronomy, allowed the researchers to successfully establish a QIS research centre in Calgary, significant in part because QIS has been identified as a research pillar in the University of Calgary's academic plan.

Based on the research activity in atom trapping and cold atom physics, Dr. Thompson has been invited to join TRIUMF, Canada's national laboratory for particle and nuclear physics, as part of an international collaboration to build a large scale ion trap facility for studies of stable and unstable isotopic species.



Institution: *University of Calgary*

Lead Scientist: *Dr. Robert Thompson*

Funding Partners: *Canada Foundation for Innovation, University of Calgary*

ASRIP Funding: *$199,000*

Total Project Cost: *$497,093*

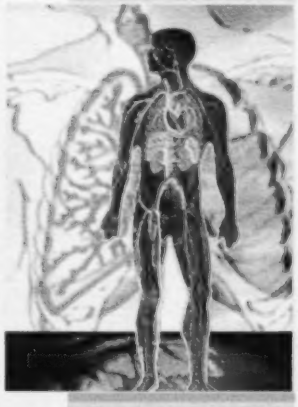
02-054 ***'Cellular/Molecular Biology Core Equipment'***

Inflammatory airway diseases such as asthma are a major health care problem worldwide. Statistics show a continued rise in the incidence and prevalence rates of asthma. Asthma is both a potentially deadly disease and costs Canada an estimated $1 billion annually in associated medical treatments. To lower the risks and costs associated with asthma and other inflammatory airway diseases, scientists must first better understand the disease mechanisms responsible. Researchers at the University of Calgary hope to identify new therapies that will lead to improved quality of life for sufferers of these diseases.

The project involved the purchase of infrastructure to permit studies of the molecular events causing asthma and chronic obstructive pulmonary disease (COPD), and to build a major new research initiative in this area at the University of Calgary. Key items included an Applied Biosystems Sequence Detector, to quantify gene expression from small numbers of cells, and an autoMACs system for isolating inflammatory cells from biological samples. These items will help researchers to understand mechanisms that cause activation of inflammatory cells in asthma and COPD, and to understand how common respiratory viruses trigger acute attacks of these diseases.

The facility aquired through the ASRIP has attracted highly qualified personnel. Two targeted recruitments have been completed and two other recruits have been identified and interviewed and are expected to arrive within the next year.

There is no question that the Respiratory Research Group has facilities that are comparable to the best in Canada and this generates major excitement among recruits and potential trainees. In the past year, Dr. Proud's own laboratory has recruited two graduate students whose projects rely on the infrastructure. This will also enhance the ability of our new faculty recruits to attract students and postdoctoral fellows.



The infrastructure has also enhanced research collaborations over the past year Dr. Proud has initiated and maintained international collaborations, with a colleague at Johns Hopkins University on the role of nitric oxide in the host defense against viral exacerbations of airway disease, and with scientists in industry who are collaborating on gene array studies to define the full spectrum of host responses to rhinovirus infection.

New therapies for asthma and other inflammatory ariway diseases

The ASRIP funding allows Dr. Proud to continue to focus on the vigorous research themes he first began almost twenty years ago at the famed Johns Hopkins University School of Medicine. As holder of a Canada Research Chair in Inflammatory Airway Diseases, he is also creating a unique broad-based multidisciplinary research team including five other university researchers from complementary fields. This experienced team will collaborate with three other research groups at the U of C - Immunology, Mucosal Inflammation, Gastrointestinal Diseases - to create a centre for the study of inflammatory diseases that will be unmatched in Canada.

Institution: *University of Calgary*

Lead Scientist: *Dr. David Proud*

Funding Partners: *Canada Foundation for Innovation, Alberta Heritage Foundation for Medical Research, Johns Hopkins University*

ASRIP Funding: *$125,000*

Total Project Cost: *$322,050*

300-10-2-11 ***'Assessment of Anthropogenic Perturbations of Major Biogeochemical Cycles Using Stable Isotope Techniques'***

Dr. Bernhard Meyer, the University of Calgary

The ecosystem connects the land, oceans, the forests, and the air we breathe. Each cycle relies on the others to maintain a healthy balance. Anthropogenic (human) production of nitrogen, carbon, and sulfur impacts the earth's biocycles. At present, we are only beginning to understand the effects of those extra emissions on our planet. The long-term goal of Dr. Mayer's research is to separate natural and anthropogenic components of environmental and climatic change on our continents. This is crucial for the interpretation of today's global climate change.

Dr. Mayer's research aims to find some concrete answers. His research, through the Isotope Sciences Laboratory at the University of Calgary, is to acquire an improved understanding of current and past biogeochemical cycling of carbon, nitrogen, oxygen, and sulfur in terrestrial and aquatic ecosystems. Stable isotope techniques are among the most powerful tools for reaching this goal. A further objective of Dr. Mayer's research is to obtain paleoenvironmental and paleoclimatic information for the Holocene (last 11.000 years) through isotopic studies of historical archives of pristine terrestrial and aquatic ecosystems such as tree rings, paleosols, peat deposits, lake sediments, and ice cores.

Interpretation of today's global climate change

A state-of-the-art gas source mass spectrometer and several peripheral sample preparation devices were purchased and installed with the funds obtained from the ASRIP, and other funding sources. These instruments allow and hydrogen in a wide variety of gaseous, liquid, and solid samples. Measuring isotope ratios enables the scientists to "fingerprint" the sources of nutrients and/or pollutants and to assess their fate in the environment.

Some examples of recently conducted research projects enabled by the new infrastructure include (1) tracing the fate of anthropogenic CO2 during subsurface storage in oil fields, (2) assessing water quality by determining the sources of riverine nitrate, and (3) tracing the fate of anthropogenic sulfur near sour gas processing plants. A better understanding of anthropogenic perturbations of the carbon, nitrogen, and sulfur cycles on our continents will form the basis for improving the environmental quality in Canada.

The ASRIP-funded infrastructure is a center piece in the analytical facilities of the Applied Geochemistry group at the University of Calgary. This group is an integral part of the University's initiative to become a leader in the field of Energy and the Environment.

As a result of the new infrastructure, the research group has become involved in a number of major federal and provincial research initiatives such as the Canadian Water Network, the Weyburn CO_2 Monitoring and Storage project, and the Alberta Ingenuity Advanced Water Research Centre.

These major research projects on both the federal and provincial level have resulted in numerous beneficial collaborations with a large number of researchers and graduate students. This has fostered collaboration with colleagues on campus, at other Canadian Universities, in government research labs, and in the private sector.

Institution:
University of Calgary

Lead Scientists: *Dr. Bernhard Meyer*

Funding Partners:
Canada Foundation for Innovation, University of Calgary, BITOEK Bayreuth, Komex International, PanCanadian

ASRIP Funding:
$199,000

Total Project Cost:
$549,064

300-10-1-6 & 99-13 ***'Research Infrastructure for Experimental Computing'***

This project consisted of the construction of a research and teaching facility (CSC) and the renovation of Athabasca Hall, which houses offices and the administrative function in the Department of Computing Science. The completion of the new Computing Science Centre (CSC) effectively consolidates all staff research, teaching and offices in one complex - instead of being spread among four, non-adjacent campus buildings. The Computing Science Centre holds two lecture theatres, four seminar rooms, four meeting rooms (including one conference room), 1,285 m^2 of research lab space, 1,564 m^2 of teaching lab space, and 568 m^2 of offices for postdoctoral fellows, research assistants and other special use areas.

U of A researchers have been successful in high profile funding initiatives in no small part because of this new facility. These initiatives include:

WestGrid: a $48M funded project to purchase and install innovative grid-enabled computing infrastructure across Alberta and BC.

High-Performance Access to Grid Computing Project: a Departmental partnership with BigBangwidth, Inc. to trial an advanced network connectivity project at the UofA.

Alberta Ingenuity Center for Machine Learning: research and office facilities for seven core faculty members, 16 technical and administrative staff, and three postdoctoral fellows. A total of 38 graduate students have been or are being supported by the center.

Centre for Intelligent Mining Systems: to research and develop novel techniques that integrate sensing with automated reasoning and human interaction to improve the performance of the surface mining process.

High-Performance Infrastructure for Search and Optimization: IBM, Hewlett-Packard, and Intel have joined to fund the infrastructure for collaborative research in computer games, real-time strategy games, study of protein structures, and compilation of computer programs.

Core Participation in 3D Web Research Network: The Network is a national research cluster to promote the development and delivery of quality 3D learning resources, including digital models, artifacts, images and video, 3D web interfaces, and interactive graphics over advanced networks. The department has a state-of-the art virtual reality and graphics research lab housed within the new CSC facility.

The Computing Science Centre at the University of Alberta

The Software Engineering Collaboratorium: This space houses the group's activities in collaborating with other universities and industrial partners including IBM, Bell Canada, klocwork Inc., and the Institute for Robotics and Intelligent Systems (IRIS).

New Centres of Excellence for experimental computing

These new centres of excellence and research programs have completely filled the available research laboratory and research office staff space in the CSC. There are approximately 200 graduate students (an increase of 154% since 1999), 8 postdoctoral fellows, and 10 research assistants making use of the CSC research facility along with numerous visiting scholars and technical staff.

Between 1999 and 2004, there were 27 new faculty hires. It would not have been possible to attract the new staff without the new laboratory research space that the facility provides for all areas of computing science. Many spin-off companies are anticipated as a result of the investment in the Computing Science Centre.

Institution: *University of Alberta*

Lead Scientist: *Dr. Randy Goebel*

Funding Partners: *Canada Foundation for Innovation, NSERC, University of Alberta, CEL Corp, Net-Linx, Syncrude, COURSE, Electronic Arts, Telus*

ASRIP Funding: *$2,922,500*

Total Project Cost: *$13,610,000*

Dr. Naser El-Sheimy holds a Canada Research Chair in Mobile Multi-Sensor Geomatics Systems

Institution: *University of Calgary*

Lead Scientists: *Dr. Naser El-Sheimy*

Funding Partners: *NSERC, Dept. of National Defence, Kvaerner, Petro Canada, Cell Loc, Canadian Commercial Corp., Rockwell International, other private sector industry*

ASRIP Funding: *$664,000*

Total Project Cost: *$1,908,280*

300-10-2-16 ***'Multi-Sensor Facility for Real-Time Mobile Mapping and Emergency Response Applications'***

The infrastructure provided for by the ASRIP helped build a Multi-sensor Lab at the Department of Geomatics Engineering at the University of Calgary.

Geomatics is the science and technology of gathering, analyzing, interpreting, distributing and using geographic information in real-time applications. Emerging as one of Canada's fastest growing technology sectors, geomatics encompasses a broad range of disciplines that results in a variety of practical applications including tracking wildlife, monitoring forest fires, discovering underground oil reservoirs and aiding ships, aircraft and vehicles to navigate safely.

Dr. El-Sheimy's facility consists of a series of sensors and devices, such as gyrocompasses and accelerometers, digital cameras, precise time and frequency standards, and wireless data links. These sensors have been used in a number of research projects related to geotelematics, multi-purpose/multi-spectral airborne remote sensing, real-time information systems, intelligent transportation systems (ITS), and Geospatial Information Systems (GIS).

911 calls can now be traced to a cell phone callers location

Such integrated systems play an important role in deriving rapid, accurate knowledge of the landscape and environment. For example, one development in Dr. El-Sheimy's lab is the real-time mapping of forest fires, providing the information necessary for the rapid detection and containment of the fire. Using the new technology, firefighters will be able to use the high-tech system to detect hidden "hot spots" and greatly increase firefighting accuracy.

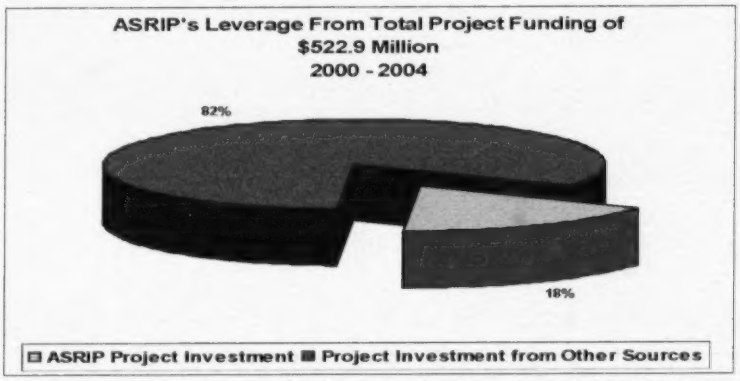
Another development involves the integration of wireless communications devices and navigation sensors. This technology allows 911 operators to derive the position of a cellular phone user, and dispatch emergency teams to the correct location, something that was not possible before. By minimizing emergency response times, the new technology decreases the risk of permanent injuries and will help to save lives.

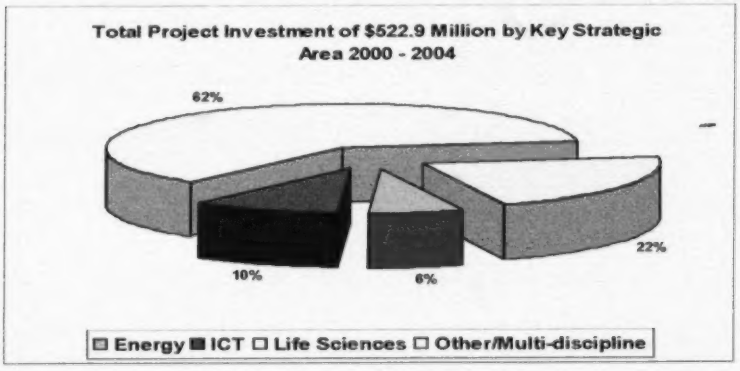
These examples are only a few of the benefits of geomatics that will directly affect the quality of life of Albertans.

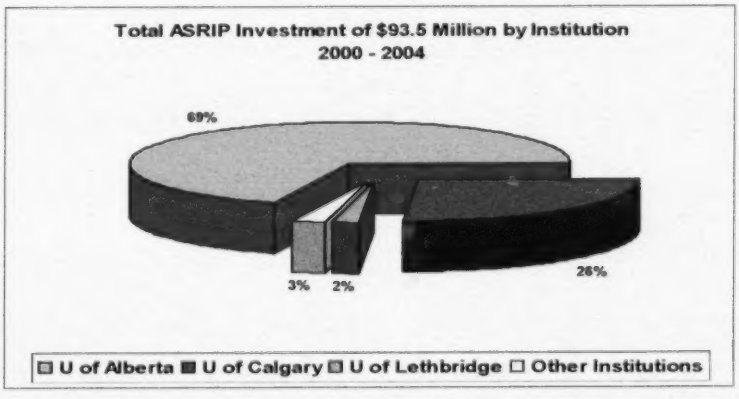
The Department of Geomatics Engineering, The University of Calgary, has established a truly worldwide reputation for excellence in research and post-graduate studies. Its faculty members and graduate students have received scores of national and international awards in recognition of their innovative contributions. Its graduates are contributing to a very rapid growth of the geomatics industry in Alberta and in the rest of Canada.

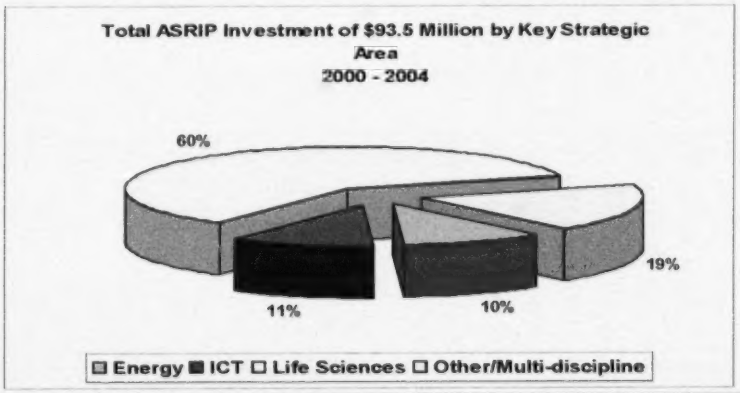
The infrastructure has helped the University of Calgary to recruit and train at least 30 graduate students. The use of the infrastructure allows the students to conduct leading-edge and innovative research, incorporating the latest technological advances in real-time systems. Multi-sensor systems are fundamental components of applications ranging from aircraft navigation to environmental monitoring, and are in high demand within the industrial sector, particularly in Alberta.

Figure 1
ASRIP's Strategic Investment's – Research Capacity in Key Strategic Areas









Since 2000, ASRIP has invested strongly in Life Sciences ($56.6 million-60%), Information and Communication Technology ($10 million-11%), Energy ($9.6 million-10%) and Other/Multi-disciplinary ($17.3 million-19%). Other research areas supported include: climate change/ environment, science awareness, engineering and technology commercialization.

The Program

The Alberta Science Research and Investments Program was announced in early 2000, and was an amalgamation of the earlier Intellectual Infrastructure Partnership Program and the Science and Research Fund. ASRIP supports research through two distinct funding streams:

Cleanroom facility for research in the areas of nanotechnology and micro systems.

1. **Research Infrastructure** stream supports strategic investments in research infrastructure (e.g.- equipment, construction, renovations, etc.), which address fundamental infrastructure needs related to maintaining or enhancing the competitiveness of the Alberta university research system and contribute to Alberta's economic competitiveness and quality of life.

   In addition, this stream of ASRIP is the primary vehicle for leveraging support from other sources such as the federal Canada Foundation for Innovation (CFI) and the private sector in order to maximize the research dollars flowing into Alberta.

2. **Enabling Research Application and Technology Transfer (ERATT)** stream supports strategic investments in research infrastructure and operating funds that will facilitate the transfer of ideas and knowledge to their application, thereby strengthening Alberta's technology commercialization network. ERATT projects are generally supported in part by receptor industries.

ASRIP's targeted research areas are: Energy, Life Sciences, and ICT

ASRIP applications are assessed for research excellence and alignment with Alberta's strategic priorities, as identified by the Alberta Science and Research Authority (ASRA). The three strategic areas of priority identified by the ASRA are:

- Energy;
- Life Sciences (the key components are health and wellness, agriculture/food/ forestry and environment); and
- Information and Communication Technology (ICT).

Proposals undergo an external peer review by leading scientists from around the world and are also reviewed by individual members of the ASRIP Scientific Review Panel. The Minister of Innovation and Science makes the final funding decisions, based on the recommendations of the ASRIP Scientific Review Panel.

In the 2003-2004 funding round, a total of 60 "Research Infrastructure" proposals requesting nearly $114 million and nine "Enabling Research Application and Technology Transfer" proposals requesting $3.5 million were submitted to the ASRIP competition.

Following a thorough review by external reviewers and the Scientific Review Panel, 13 "Research Infrastructure" projects were awarded $21.4 million and 4 ERATT projects were awarded a total of $1.2 million.

The ASRIP program streams have been expanded to include distinct streams for reinvestment in previously sucessful projects and to support platform technology, particularly in high performance computing. Information on the current ASRIP competition is available at www.innovation.gov.ab.ca

The Alberta Science and Research Investments Program ran three competitions between 2000 and 2004. In that time, the program has significantly contributed to the Innovation and Science business plan strategy "to provide strategically targeted support for Alberta university research infrastructure." The ASRIP is the only major program within the Ministry that provides funding dedicated specifically to infrastructure and, as such, it is an essential vehicle for universities seeking to aquire critical infrastructure in order to undertake innovative, leading edge research. The research infrastructure funded through previous competitions has also been instrumental in launching or sustaining areas of research excellence and assisting in recruitment and retention efforts at Alberta universities.

Two significant changes have been made to ASRIP since its inception:

- In the 2001-2002 funding round, applications from two additional CFI programs were accepted by ASRIP in a one-time only arrangement. "New Opportunities" projects and infrastructure in support of "Canada Research Chairs" were co-funded with the CFI.

- A third funding stream, Science Awareness and Promotion, was discontinued in ASRIP's 2003-2004 funding year.

After five years of operation, the Alberta Science and Research Investments Program has had a very significant impact on the larger research community. ASRIP has promoted research quality, fostered innovation, and supported initiatives of strategic benefit to Alberta. It has also led to research initiatives, that have gained national and international recognition.

Since its inception, ASRIP has targeted investments in Life Sciences ($56.6 million), Information and Communication Technology ($10 million), Energy ($9.6 million), while supporting multi-disciplinary projects outside the areas of priority ($17.3 million). Other research areas supported include: climate change/ environment, science awareness, engineering and technology commercialization.

Since 2000, ASRIP has invested $93.5 million in targeted research projects

A total of 269 application were received for funding in the three ASRIP competitions since 2000. The success rate for applications had been approximately 47%, or 126 funded projects. ASRIP's total investment of $93.5 million went to the University of Alberta (69%), followed by the University of Calgary (26%), the University of Lethbridge (2%), and other institutions (3%) - (Figure 1).

A listing of all ASRIP projects funded from 2000 to 2004 is detailed in Appendix 1, and earlier projects funded by ASRA from 1997 to 2000 are detailed in Appendix 2.

Alberta Innovation and Science

For more information visit our website at: www.innovation.gov.ab.ca

Appendix 1
Alberta Science and Research Investments Program
Research Infrastructure Stream
Project list 2000-2001

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-151	Creation of a Research Institutes for the Study of Supply Chain Collaboration	An outline supply chain simulation environment within which researchers will engage in collaborative research with the business community. Using broadband technology, the aim is to understand and apply collaboration technology, both within an individual business and business to business.	Athabasca University	$2,423,000	$210,000	Other/ Multi-discipline
01-038	Magnetic Resonance Imaging for the Assessment of Stroke and Other Neurological Disease	MRI techniques will play a critical role in understanding the evolution and treatment of strokes in humans. The goal of our proposal is to acquire the infrastructure needed to facilitate the development of a state-of-the-art MRI stroke research program a the U of A.	University of Alberta	$713,663	$355,000	Life Sciences
01-039	Electrospray Ionisation - High Field Assymmetric Waveform Ion Mobility Spectrometry - Tandem Mass Spectrometry (ESI-FAIMS-MS/MS)	A promising new technique for identification and characterization of polar compounds in complex matrices. The infrastucture will aid human exposure research on disinfection by-products and metabolites, cyanobacterial toxins, gas/oil well flare emissions, and arsenosugars and metabolites in seafoods.	University of Alberta	$494,036	$197,614	Energy
01-041	Solid-State Nuclear Magnetic Resonance Facility	To establish a state-of-the-art NMR facility for the investigation of solid materials. This facility will have a major impact on the research programs of several researchers in the physical sciences area and will serve as an important training ground for graduate students.	University of Alberta	$1,400,000	$650,000	Other/ Multi-discipline
01-045	Bamfield Marine Station - Infrastructure For Studies In Biodiversity and Bio-environmental Fluid Dynamics	Bamfield marine station will utilize infrastructure to support new research activities in the ecosystem time series and biodiversity studies of Barkley Sound, and bio-environmental fluid dynamics.	University of Alberta	$3,046,755	$300,000	Life Sciences
01-047	Understanding Land Cover Through a Strategic Infrastructure Development	The primary outcome of this proposal is the consolidation of infrastructure that enhances our current abilities to process, store and manipulate extremely large imagery and related data, and data sets linked to provincial, national and international initiatives.	University of Alberta	$898,478	$350,000	Life Sciences
01-048	Precision Ranching	Sustainable landscape and animal management systems. New and emerging technologies will be used to study complex spatial and temporal interactions among fauna, flora, climate, soils, topography and human factors and their response to management options.	University of Alberta	$1,137,300	$350,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-049	Meanook Biological Research Station Enhancement Proposal	MBRS is a year round facility supporting critical research efforts to further the efficient and sustainable management of Canada's Boreal Forest. Will expand the research capabilities of MBRS with the addition of a chemical lab and computing facilities housed in a new building.	University of Alberta	$670,000	$287,500	Life Sciences
01-050	Molecular Characterization of Cancer Cell Populations by Single Cell and Living Cell Analysis	Funds for a laser microdissector and robotic microtweezers to isolate/ manipulate cells or subcellular regions. Multi-user laser-assisted technolgies permit correlation of molecular properties with cell fundtion, with morphology and position within a cancer mass, a detailed analysis of fresh human tissue specimens not otherwise possible.	University of Alberta	$1,782,244	$533,000	Life Sciences
01-053	Cardiovascular Ion Channel Gene Therapy Unit (CIGNET)	CIGNET is a core molecular physiology facility dedicated to the study of the role of cardiovascular potassium channels in health and disease. Research will range from molecular biology to whole animal and human physiology. CIGNET will support translational research on common diseases (eg. Sudden death and hypertension).	University of Alberta	$800,000	$320,000	Life Sciences
01-055	Geochemical Analytical Facility	The facility will provide chemical analysis for multidisciplinary research on assessment and remediation of contaminated sites. Users from science and engineering will have access to much less expensive analysis for their research projects allowing increased analytical capability for enhanced data gathering.	University of Alberta	$667,100	$295,000	Energy
01-056	Biotelemetry Analysis System: Infrastructure for Cumulative Effects Assessment	The proposed infrastructure combines new space-based technology with sophisticated statistical computing and modeling to develop a powerful new tool for evaluating the cumulative effects of land-use development on wildlife populations. This new tool can be applied to a host of species and adapted to landscapes worldwide.	University of Alberta	$856,408	$200,000	Life Sciences
01-059	Infrastructure for Surface Mining Research Laboratory	Infrastructure and facilities will achieve excellence in surface mining research and attract highly qualified researchers. They will maintain sustainable research programs to advance knowledge and frontiers in mining engineering, with impact on industry, Alberta and Canada.	University of Alberta	$2,000,000	$660,000	Energy

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-060	Infrastructure for Deposition and Characterization of Combinational Arrays of Thin-Film Inorganic and Opto-Electronic Devices	Construction of a deposition system to define and control the composition and architecture of combinatorial arrays of inorganic thin films and thin film heterojunctions for photovoltaic applications.	University of Alberta	$1,222,275	$540,000	Other/ Multi-discipline
01-061	Electronic Data Infrastructure Upgrade	A major upgrade of the networks, servers, and data security systems within the Department of Chemistry. Enhancements include faster networks, larger and faster servers, security systems designed to ensure data integrity.	University of Alberta	$459,079	$200,000	ICT
01-063	Campus Alberta Research Data Centres	This project is part of network of regional Research Data Centres, which will establish in Libraries at the U of A & U of C Research Data Centres to house secured access to select confidential data files from Statistics Canada.	University of Alberta	$1,370,638	$685,316	ICT
01-066	Network Enabled Smart Robotic Systems	More advantageous deployment of robotics, sensing & network technologies in areas of Community Health, Environment and Resources in Alberta demands the need for a Laboratory focused on advancing new ways of integrating fundamental research in these areas.	University of Alberta	$2,029,683	$300,000	ICT
01-070	Whole Body Calorimetry	This initiative will result in development of a whole body calorimetry room at the U of A dedicated to accurate measurement of energy metabolism in humans. The unit will enable researchers to investigate mechanisms of energy utilization throughout the life cycle and in various disease states.	University of Alberta	$770,000	$350,000	Life Sciences
01-162	Phase I Clinical Trials and Research Unit	Medical unit for in-patient clinical trials and research. Purchase monitoring equipment-central station, network of 16 peripheral physiological monitors, replacement of equipment for processing and storage of blood and samples, and for minor renovations.	University of Alberta and Capital Health Authority	$363,932	$152,500	Life Sciences
01-102	Gene Therapy Initiative the University of Calgary	Recent advances in biotechnology have made it possible to deliver foreign genes into cells for the treatment of human diseases. The purpose of this project is to establish a GLP/GMP facility that will allow researchers to develop gene therapy.	University of Calgary	$2,366,142	$600,000	Life Sciences
01-103	Creation of a Multidisciplinary 3 Dimensional Morphometrics Centre	Infrastructure to create a multi-disciplinary laboratory for 3-D morphometrics. Components include a Micro CT,Reflex microscope and facilities for image analysis. Facilities will be used by researchers across faculties at U of C & U of A.	University of Calgary	$475,970	$235,624	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-105	Nutrition, Genetics and Human Performance	Newly-equipped labs in Faculty of Kinesiology toward investigation of genetic risk factors and health status of elite athletes. In collaboration with the Faculty of Medicine, we will share core technologies, enhanced recruitment and scientific interaction on this emerging health science.	University of Calgary	$8,527,202	$3,256,247	Life Sciences
01-111	Multicomponent Seismic data Acquisition System	A system for time-lapse monitoring of CO2 injection and other acid gases in depleted hydrocarbon reservoirs and deep aquifers in Alberta. Geological sequestration of CO2 is a viable technology for the reduction of greenhouse gas emissions.	University of Calgary	$3,399,512	$1,160,000	Energy
01-112	Advanced Space Instrument Facility	Develop "Advanced Space Instrument Facility"(ASIF) at the U of C, to support development of advanced space science instruments for scientific micro-satellites and satellites.	University of Calgary	$598,500	$299,000	Other/ Multi-discipline
01-113	Language Research Facility	A facility for psycholinguistic experimentation on 2nd language acquisition in adults and its implications for improvement of technology-enhanced language instruction, for curricular and teacher development, and for general policy issues related to 2nd or heritage languages.	University of Calgary	$1,077,750	$430,000	Other/ Multi-discipline
01-120	Genetics and Developmental Biology Laboratories	Establishment of the Genes and Development Research Group and the construction of a blend of individual labs without walls and specialized research facilities, (eg. microsurgery, viral gene transfer, digital imaging). These facilities, coupled with the outstanding investigators group, will enhance Alberta's efforts in genetic and gene therapy.	University of Calgary	$1,066,900	$190,000	Life Sciences
01-123	Integrated Centre for Advanced Materials Characterization	The acquisition of this instrument will serve to further strengthen our interdisciplinary research in areas such as the development of new solids, thin films, and polymers.	University of Calgary	$1,700,373	$490,000	Other/ Multi-discipline
01-125	Research Capability Upgrade of the Rothney Astrophysical Observatory	Instrument upgrade to remain competitive, train students in cutting edge astronomical instrumentation, observation. Improve infrared imaging through enhanced IR & optical imaging cameras & controllers, spatial resolution through tip/tilt adaptive optics, improved efficiency through automation of telescopes.	University of Calgary	$552,000	$175,000	Other/ Multi-discipline
01-159	Molecular Biology Infrastructure and Cell/Tissue Culture Facilities for Novel BioChemical Engineering Research	Will build on a proven track record in the biotech field and pursue innovative projects in upstream, process and downstream biochem engineering and will serve as a versatile and powerful analytical facility for other researchers.	University of Calgary	$511,400	$255,700	Life Sciences
				$43,380,340	$14,027,501	

Alberta Science and Research Investments Program
Research Infrastructure Stream
Project list 2001-2002

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-044	NMR, GC-MS & computational tools to support research programs in chemistry and biochemistry	Core research tools for explaining chemical structures & understanding reaction pathways. Acquisition of spectroscopic, chromatographic, and computational equipment will support research and collaborations with industry and international scientists.	King's University College	$665,009	$200,000	ICT
02-043	Advanced infrared physics laboratory	Advanced infrared physics laboratory for the development and calibration of radiometers and spectrometers for remote sensing.	University of Lethbridge	$197,500	$79,000	Other/ Multi-discipline
02-080	Canadian Centre for Behavioural Neuroscience	Major equipment items include attachments for 500 MHz NMR to allow in-vitro imaging of rats and mice, electrophysiological equipment and behavioural equipment.	University of Lethbridge	$770,780	$272,429	Life Sciences
02-081	Plant Biotechnology Infrastructure: Applications of Molecular Biology and Gene Expression Assays	Develop a plant molecular biology laboratory. Key pieces of equipment include plant growth chambers, specialized camera systems, microscopes and specialized equipment to support molecular research approaches.	University of Lethbridge	$171,825	171,825	Life Sciences
02-125	The Banff International Research station for mathematical innovation and discovery (BIRS)	A collaborative Canada-US venture to operate an international centre for the mathematical sciences and its applications. Infrastructure is for a computer network and essential renovations to the Banff Centre.	The Banff Centre	$1,507,778	$500,000	Other/ Multi-discipline
02-045	Spindle Position and Checkpoint Control During Mitosis	Research into the mechanisms for nuclear and spindle positioning and the signaling pathways controlling cell division.	University of Alberta	$530,220.00	212,088	Life Sciences
02-046	Laboratory for Colloids and Complex Fluids	A laboratory to investigate and control the properties of complex fluids such as are found in oilsands processing, wastewater treatment, pulp and paper manufacture and biological fluids.	University of Alberta	$312,500	125,000	Energy
02-047	High-Capacity Digital Communications Lab	A research facility to facilitate design, simulation, implementation and testing of high capacity, high reliability digital communications systems.	University of Alberta	$312,500	125,000	ICT
02-058	Nanofabrication Facility	The facility will significantly extend the capabilities of the existing open-access Microfab to that of the best in Canada. Enables innovative research in nano-biotechnologies, nanoscience, and nanomaterials in ICT, health, and resource sectors.	University of Alberta	$8,247,533	$3,082,460	Other/ Multi-discipline

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-060	Protective Clothing and Equipment Research Facility	An enhanced flash fire simulation / instrumented mannequin facility, and equipment for fundamental material combustion studies, combined heat / mass / moisture transfer studies and ultra-violet protection research.	University of Alberta	$1,462,301	$537,462	Other/ Multi-discipline
02-062	Centre for Comparative Psycholinguistics	Enables the multifaceted psycholinguistic study of language representation and processing among speakers of indigenous and minority languages.	University of Alberta	$743,685	$297,474	Other/ Multi-discipline
02-066	Westgrid: The Western Canada Research Computing Grid	An integrated system of high-performance computing facilities, data storage capability, collaborative work sites, high-speed networks, and human resources that together provides a unique shared research infrastructure designed for and by research groups across Alberta and British Columbia.	University of Alberta	$40,571,910	$5,995,420	ICT
02-067	Tailings Research Facility	The Facility comprised of delivery, treatment and deposition modules carries out research to develop novel and innovative approaches to treating tailings to reduce the environmental impact of the bitumen extraction.	University of Alberta	$2,000,000	$500,000	Energy
02-068	Facility for Study of Effectiveness of Collaborative, Distributed Software Development	To support research on how software can be conceived, developed and maintained collaboratively in distributed locations. Special focus is on heterogeneous development environments, embedded systems, and software product lines.	University of Alberta	$1,654,174	$546,350	ICT
02-069	High-Field MR for Biological Image-Guided Tomotherapy	A high-field (3T) MR system to develop biological tumor targeting for adaptive tomotherapy, and to study the subsequent metabolic and biochemical treatment effects on tumors and healthy tissues.	University of Alberta	$9,776,300	$3,846,000	Life Sciences
02-083	University of Alberta Heart & Stroke Research Centre	A transnational human vascular biology research facility for the new Alberta Cardiac Institute. It will study of heart attacks and strokes, and houses state-of-the-art cardiovascular imaging tools, basic science core labs, a gene therapy facility and an outcomes research centre.	University of Alberta	$16,613,301	$3,244,910	Life Sciences
02-091	Project CyberCell - Proteomics, Metabonomics and Functional Genomics Experimental Component	To quantitatively determine the dynamic and structural nature of cellular processes in *E. coli*, with the ultimate goal of recreating the living cell computationally. This is a joint project from the Universities of Alberta, Calgary and Lethbridge.	University of Alberta	$17,454,775	$4,700,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-105	Alberta Centre for Surface Engineering and Science (ACSES)	An integrated facility for surface characterization and modification, supporting interdisciplinary research throughout Alberta. Essential instruments that previously not available or not generally accessible within the province are provided.	University of Alberta	$13,163,230	$4,000,000	Energy
02-107	The University of Alberta Protein and Gene Discovery Centre	New technology and facilitates for research in high-throughput chemical genetics, genomics and proteomics.	University of Alberta	$9,840,289	$1,800,000	Life Sciences
02-108	Modern Infrastructure to Support Inter-disciplinary Water Chemistry in the 21st Century	Research in industrial impacts on environmental and human health. Included are a freshwater biogeochemistry laboratory facility, and three fully gauged and monitored experimental catchments in boreal plains, foothills, and alpine locations in Alberta.	University of Alberta	$9,630,188	$1,400,000	Life Sciences
02-109	Alberta Cooperative Conservation Research Unit: Infrastructure for Studies in Conservation Science	The Unit functions as a central 'umbrella' for research innovation including biomonitoring, landscape and population modeling, and application of telemetry, GPS, GIS and DNA fingerprinting to resource management.	University of Alberta	$2,483,826	$320,000	Life Sciences
02-110	2-Photon/Confocal Microscopy in Voltage-Clamped Respiratory Neurons	Infrastructure to understand perinatal respiratory network functions, sudden infant death syndrome and other life-threatening diseases associated with disturbed neuronal respiratory functions.	University of Alberta	$1,382,797	$518,620	Life Sciences
02-111	Centre for Symbolic Computation	Development of software for symbolic computation for use in applied mathematics and in high energy and condensed matter physics, computational fluid dynamics, and electrical and chemical engineering.	University of Alberta	$347,475	133,835	ICT
02-112	Development of a Core Facility for Spatial Applications of Social Ecology	Development integrative models that involve both socio-economic and environmental variables for improved environmental and natural resource management planning.	University of Alberta	$505,400	$173,240	Life Sciences
02-113	Laboratory for Perceptual Motor Behaviour in Down Syndrome and Other Special Populations	A laboratory that is committed to the study of perception and human movement within special populations and across various levels of analysis.	University of Alberta	$391,000	$100,000	Life Sciences
02-114	Electromagnetic Instrumentation for Studies of the Continents	Infrastructure for subsurface imaging techniques with natural electromagnetic signals for use in earthquake hazard research, tectonics studies, mineral exploration and environmental studies.	University of Alberta	$296,057	$118,423	Energy

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-121	Ion Beam Laboratory for Nanoscale Materials Processing and Patterning	A combined facility for advanced ion implementation and optical and nanostructrual characterization.	University of Alberta	$661,853	$199,575	Life Sciences
02-088	Creation of the Alberta Diabetes Research Centre (ADRC)	A state-of-the-art multidisciplinary diabetes research facility. This research centre will provide Alberta with the infrastructure and resources needed to maintain and expand its existing diabetes research excellence.	University of Alberta	$39,832,358	$6,000,000	Life Sciences
02-090	Centre of Excellence for Viral Hepatitis Research	A multidisciplinary centre which builds and equips new space (13,250 sq ft) including animal facilities, provide equipment for existing laboratories, expand our tissue bank and establishes a node in a national database for viral hepatitis.	University of Alberta	$9,264,007	$2,000,000	Life Sciences
02-048	Large Scale Tissue Culture and Bioreactor Facilities for Biomedical and biochemical Engineering Research	Infrastructure for the Pharmaceutical Production Research Facility including computer controlled bioreactors and fluorescence microscopy equipment.	University of Calgary	$378,830	$151,532	Life Sciences
02-049	Cellular Mechanobiology and Surgical Simulation in Orthopaedic Bioengineering	Research into invertebral disc degeneration and osteoarthritis including tissue engineering and the development of surgical simulations.	University of Calgary	$428,897	$125,000	Life Sciences
02-050	Energy and Imaging	A laboratory where imaging techniques are used as tools to solve chemical and petroleum engineering problems.	University of Calgary	$650,000	$175,000	Energy
02-051	Molecular and Cellular Biomechnaics and Biomedical Engineering	Laboratories for molecular and cellular biomechanics and biomedical engineering research. The long-term aim of research in these facilities is to gain an understanding of musculo-skeletal growth, adaptation, healing and ageing.	University of Calgary	$315,586	$123,078	Life Sciences
02-052	Analysis of Gene Regulation and Function Using Transgenic Model Systems	Equipment to expand the ability at the U of Calgary to carry out sophisticated types of phenotype analysis in transgenic animals.	University of Calgary	$317,754	$127,100	Life Sciences
02-053	Medical Genetics Research Laboratory	Meiotic research infrastructure to understand mechanisms that affect the production of chromosomal abnormalities in human gamates.	University of Calgary	$313,572	$95,988	Life Sciences
02-054	Cellular / Molecular Biology Core Equipment	Equipment for the new Respiratory Research group initiative on the molecular pathogenesis of inflammatory airway diseases. A major focus will be on defining the mechanisms underlying virally-induced exacerbations asthma.	University of Calgary	$316,894	$125,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-055	Studies on the Cause, Prevention and Cure of Type 1 Diabetes	Research to find the mechanisms involved in the initiation of beta cell specific immune responses and development of methods for the prevention of autoimmune diabetes. Additional plans are to develop a cure for type 1 diabetes by a novel insulin gene therapy.	University of Calgary	$640,000	$136,000	Life Sciences
02-056	Plant Metabolic Processes Biotechnology	Infrastructure for a laboratory engaged in research on the biochemistry, molecular biology, and biotechnology of plants.	University of Calgary	$372,589	$143,590	Life Sciences
02-057	RHODIUM. A Pentium Computer Ranch Catalyst Design and Chemical Modeling	A facility to carry out modeling of catalytic processing through assembly of a multi-processing computer.	University of Calgary	$312,500	$125,000	ICT
02-075	Hybrid Passive-Active Lighting, Ventilation, and Thermal Systems for Commercial and Institutional Buildings	Development of products and related software for low energy building design, including systems for daylighting, hybrid passive-active ventilation, and use of porous media to enhance performance of solar air heaters and other thermal systems.	University of Calgary	$348,000	$139,200	Energy
02-077	Experimental laboratory for internet systems and applications (ELISA)	The project provides network measurement equipment at the U of Calgary as part of a geographically distributed internet systems testbed shared with the U of Saskatchewan.	University of Calgary	$3,078,704	$605,000	ICT
02-115	Establishment of a High-Performance Real-Time Digital Signal Image, and Video Processing Laboratory	Creation a low cost automated intelligent sensors network with research and development in Real Time Digital Signal Processing, Multimedia Information Appliance Network, and Systems Identification and Advanced Control Systems.	University of Calgary	$347,642	$131,870	ICT
02-116	Thermal Science Facility	Experimental and computational facilities to perform researches in the energy environment.	University of Calgary	$360,850	$144,340	Energy
02-117	High-field Magnetic Resonance Imaging for Vascular Diagnosis and Intervention	Clinical medical imaging research in the areas whole body imaging and vascular imaging.	University of Calgary	$720,000	$220,000	Life Sciences
02-119	Foothills Climate Array	Study of regional weather variability and the underlying climatic processes to improve process parameterizations in models and provide insight 'downscaling' of climate model predictions to the scales of impact for human development and the environment.	University of Calgary	$585,005	$234,002	Life Sciences
02-120	The Experimental Economics Laboratory	A facility for innovative research on decision-making and market institutions with direct relevance to economic and social policy.	University of Calgary	$415,490	$160,490	ICT

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-124	ICU CaRES Program	Infrastructure for the acquisition, cataloguing, and storage of human material necessary for the investigation of biologic mechanisms of disease.	University of Calgary	$2,234,249	$165,000	Life Sciences
02-093	Broadband Network Reworking in Support of Bioinformatics and Imaging	Higher bandwidth connectivity is required by the Faculty of Medicine's life sciences researchers, especially those leading the ICT-intensive fields of bioinformatics and imaging, in order to remain competitive at the national and international level.	University of Calgary	$2,955,955	$800,000	Life Sciences
02-096	Centre for Advanced Functional Imaging Studies	The development of a Centre that performs molecular imaging. The 9.4 Tesla magnet and a future 10 Tesla magnet permits innovative, advanced research in the use of MR imaging to investigate disease and therapeutics in animal model systems.	University of Calgary	$23,657,302	$1,800,000	Life Sciences
02-097	Centre for Health and Policy Studies (CHAPS)	CHAPS will improve the health of Albertans and the efficiency of health care delivery in the Province. This innovation brings together core CHAPS disciplines of economics, population health, health policy analysis and health care utilization and involves close collaboration with related disciplines across the whole university.	University of Calgary	$1,656,825	$150,000	Life Sciences
02-098	Integrating Research in Osteoarthritis: From the beside to the bench and back again	A consortium of musculoskeletal investigators from the faculties of Medicine, Engineering, Kinsiology, and Science, will integrate research efforts into osteoarthritis, a degenerative disease. Equipment will consolidate 4 facilities and 2 core resources to enable the necessary multidisciplinary, translation research.	University of Calgary	$12,710,038	$1,900,000	Life Sciences
02-100	Centre for mouse genetics, physiological systems and disease	Investigators will use genetic approaches in mice to model and understand normal development and disease in humans. Conduct both high throughput mutation genes and analysis of complex mutant phenotypes, supporting Alberta's important national and international role in Functional Genomics research.	University of Calgary	$14,539,489	$900,000	Life Sciences
02-999	Athabasca University Geophysical Observatory	The geophysical observatory infrastructure consists of instruments, a high capacity data connection to them, and a building to house them.	Athabasca University	$294,200	$115,000	Other/ Multi-discipline
				258,740,942	49,991,301	

Alberta Science and Research Investments Program
Research Infrastructure Stream
Project list 2003-2004

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
04-021	Centre of Excellence for Gastrointestinal Inflammation and Immunity Research	The Centre will support a multi-disciplinary team of medical scientists in examining the environmental, microbial, immunological and genetic factors that cause the gastrointestinal disorders and related cancers that afflict 60 percent of Canadians in their lifetime.	University of Alberta	$20,508,807	$4,605,013	Life Sciences
04-031	Cardiovascular Translational Research Centre	An innovative Centre to facilitate the development of new therapeutic strategies to improve the outcome of cardiac surgery. The research has a strong translational focus, which will result in research advances being rapidly translated into optimal clinical care for the cardiac patient..	University of Alberta	$14,233,036	$2,500,000	Life Sciences
04-032	Integrated Nanosytems Research Facility	The Facility (INRF) will consist of four components that will encompass fabricating nanomaterials, the self-assembly and synthesis of molecules, nanoscale manipulation and the computing power to model, design and visualize nanosystems.	University of Alberta	$74,727,796	$4,883,118	Other/ Multi-discipline
04-033	Oil Sands and Coal Interfacial Engineering Facility	A state-of-the-art facility supporting research to develop step-out technologies in oil sands processing, bitumen extraction and upgrading, producing clean energy from coal, environmental impact minimization and improved water utilization. These issues are approached at the micro- and nano-scale and have the potential to revolutionize bitumen extraction and upgrading.	University of Alberta	$5,853,787	$1,429,669	Energy
04-036	Nanophotonics Microscopy Unit	A state-of-the-art laboratory for ultra-fine-scale characterization of materials for nanotechnology. Research in this emerging area could lead to the replacement of electronic signaling with optical techniques, increasing the speed and bandwidth of information technologies.	University of Alberta	$472,294	$152,000	Other/ Multi-discipline
04-037	Agricultural Genomics and Proteomics Centre	The infrastructure will enable the world-class researchers to identify genes and related proteins affecting processes in animal agriculture that are highly relevant to industry, including growth, waste production, and efficient nutrient utilization.	University of Alberta	$3,372,758	$1,100,000	Life Sciences
04-042	Field Facility to Support Ecosystem Management Emulating Natural Disturbances	The research seeks to understand the impact forest harvest has on forest habitats, biodiversity, and forest regeneration in an effort to optimize forest management in relation to costs and long-term benefits.	University of Alberta	$595,028	$223,740	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
04-044	Project to Restore Movement	A range of brain stimulation equipment that will place the Project at the very forefront of non-invasive study of brain function. The overall goal is to understand the normal control of movements and to use this knowledge to enhance and restore movements to people with motor disabilities resulting from strokes, accidents and other causes.	University of Alberta	$4,413,635	$510,600	Life Sciences
04-051	Canadian Molecular Cytogenetics Platform: Health Technology Assessment Facility	A national consortium of researchers and clinicians studying the application of advanced molecular cytogenetic technologies. Cytogenics is a unique diagnostic tool that can identify abnormalities in an individual's genome that can cause birth defects, developmental delay, mental retardation, growth abnormalities, infertility, recurrent miscarriages and cancer.	University of Alberta	$11,282,309	$47,714	Life Sciences
04-063	Canadian Pain Trials Network	The goals are to create new therapies, build a national pain database, develop health policies to reduce the incidence of pain, decrease its socioeconomic impact and maximize opportunities for commercialization. The network will coordinate multi-centre clinical trials for the development of novel therapies, and develop an innovative clinical research training program.	University of Calgary	$55,469	$22,507	Life Sciences
04-067	Institute for Inflammatory Diseases: A common focus for the improvement of health	The Institute brings together the facilities and researchers to develop new strategies for prevention and treatment of inflammatory disease that will lead to improved quality of life and reduced mortality, while marketing drug discoveries and creating knowledge-based jobs.	University of Calgary	18,629,196	$2,009,943	Life Sciences
04-068	Project neuroARM: MR compatible image guided robot for microsurgery	Development of an innovative medical robot system designed to enhance human-guided, robot microsurgery through magnetic resonance image (MRI) guidance, tremor elimination and increased spatial resolution.	University of Calgary	$30,000,357	$3,000,000	Life Sciences
04-069	Brain, Behaviour and Cognitive Science Imaging Facility	The expansion of the CCBN will allow researchers to take full advantage of the equipment and collaborations by bringing together researchers from Psychology, Neuroscience, Biology and Biochemistry to tackle the main research themes at the CCBN: spatial cognition and memory, motor control, neurological disorders (e.g., Parkinson's' disease, fetal alcohol syndrome, and stroke), drug addiction and brain plasticity.	University of Lethbridge	$2,865,272	$933,082	Life Sciences
				187,009,744	21,417,386	

Alberta Science and Research Investments Program
Science Awareness and Promotion Stream
PROJECT LIST 2001-2003

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-003	Alberta Science & Technology Hotlines - Science Outreach Program	To provide students, educators and the public access to scientific and technological experts. To promote scientific/technological literacy to all ages, encourage scientific and technological endeavors and careers and to excite Albertans with science and technology.	Alberta Science Literacy Association	$1,113,000	$680,000	Other/ Multi-discipline
01-150	Science Outreach-Athabasca	Involve individuals and schools to establish a knowledge bank that considers the abundant natural systems of the Athabasca region. Science awareness and promotion achieved by science camps and info sessions, and conveyed globally by internet and regionally by signs.	Athabasca University	$64,000	$48,000	Other/ Multi-discipline
01-019	Alta: A Very Large Area Time Coincidence Cosmic Ray Telescope	ALTA is a computer connected network of cosmic ray detector systems deployed in Alberta high schools and colleges in a very large area array. Using this and the Global Satellite Positioning System we search for high energy cosmic ray showers.	University of Alberta	$567,400	$300,000	Other/ Multi-discipline
01-072	Alberta Science Email Mentoring Project for Girls: SCIberMentor	The SCIberMENTOR project is an email monitoring program aimed at girls between the ages of 11 and 18. The girls will be matched with University or professional women scientists or engineers for career advice, and encouragement.	University of Calgary	$269,250	$179,250	Other/ Multi-discipline
01-076	Science Awareness on Biotechnology for Albertans	The objective of this project is two-fold: 1)to measure Albertans' awareness and knowledge of, and attitudes towards, biotechnology through a survey and series of focus groups; 2)to promote public understanding of biotec. through a website.	University of Calgary	$338,561	$30,000	Other/ Multi-discipline
02-005	"Ecology Connections:" A website (Kaninaskas Field Station)	Develop a website for high school biology teachers, students, and public in general, that connects primary literature of the science of ecology with ecological concepts present in the Alberta Program of Studies for Biology 20/30.	University of Calgary	$210,100	$99,100	Life Sciences
02-009	Visitors centre at the Rothney Astrophysical Observatory	Extend the RAO's highly successful Open House program by expanding the present facility to a frequent-access Visitor Centre, using cost-effective, astronomically-friendly lighting and providing a display area and multimedia theatre with webcasts of events.	University of Calgary	$520,000	$280,000	Other/ Multi-discipline
02-041	Collaborative Science Toys	Using collaborative tools and new media learning to create a series of musical, visual networked toys and Internet experiences, that brings experimental science research to younger people (high school and college).	The Banff Centre	$230,000	$40,000	ICT
				$3,312,311	$1,656,350	

Alberta Science and Research Investments Program
Enabling Research Application and Technology Transfer Stream
PROJECT LIST 2001-2003

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-008	Commercialization of Composting Technology	The compost technology centre has been an important focal point of applied research at Olds College. Equipment required includes a windrow turner, aerated bunker and in-channel system and site renovation.	Olds College Centre for Innovation	$335,000	$133,400	Life Sciences
01-004	Innovation and Technology Development Office (ITDO)	Funding from this proposal will help to establish, develop and market a new Innovation and Technology Development Office at SAIT. The office will promote the value of practical, industry-driven technology development projects with learning-based employment for students.	Southern Alberta Institute of Technology	$2,345,128	$225,000	Other/ Multi-discipline
01-024	Development & Verification of Techniques for Locating Harmonic Sources in Electrical Systems	Field verification and improvement of a U of Alberta developed technology for electrical disturbance detection.	University of Alberta	$387,500	$95,000	Energy
01-025	Optimization of Catalysts for Production of Polyethylene	It is proposed to optimize new catalysts we have developed for application by NOVA Chemicals Corp. for commercial production of polyethylene	University of Alberta	$818,000	$150,000	Energy
01-027	Creating a Network For an Alberta-Wide Experience Base of Software Best Practices	This project aims at creating a synergy within and between Alberta software industry and the two major Alberta universities to develop an evolving experience base for "software best practices".	University of Alberta	$1,239,165	$300,000	ICT
01-028	LINC: Learning and Innovation in New Company Creation	Object-oriented framework products and tools to create effective and efficient e-business infrastructure for engineering and other professional service firms.	University of Alberta	$1,378,000	$300,000	Other/ Multi-discipline
01-036	Laser Atmospheric Pollution Measurement	A laboratory for laser atmospheric pollution detection and an important laser trace gas sensing technology will be developed by the laboratory.	University of Alberta	$1,102,000	$252,000	Other/ Multi-discipline
01-173	Combined Enhanced Biodegration of Municipal and Agricultural Waste	Biodegration of municipal & agricultural waste in: (a) Bioreactor, & (b) Biodigestor produce gas as an alternate renewable fuel, which will be used to enhance biodegration, produce hotwater & reduce greenhouse gas emissions.	University of Alberta	$380,000	$150,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-078	Energy Efficiency Innovations for Buildings	Determine effective operating strategies for new building technologies including chilled slabs, seasonal passive ventilation, and innovative window blinds through studies of installations in new buildings.	University of Calgary	$147,400	$73,700	Other/ Multi-discipline
01-079	Research Transition Facility	The Research Transition Facility will provide much needed early-stage incubator space for University spin-off companies. The RTF will support commercialization, and create knowledge-based employment opportunities.	University of Calgary	$3,825,000	$1,400,000	Other/ Multi-discipline
01-127	Infrared Water Vapour Monitor	Development of an infrared water vapor monitor to commercialization as a possible Canadian contribution to the ALMA project.	University of Lethbridge	$260,000	$110,000	Other/ Multi-discipline
01-128	Protecting Intellectual Property and Maximizing the Commercial Potential of Our Discoveries	To strengthen the university's ability to manage our intellectual property and to attract Canadian industrial partners to exploit it and to facilitate the development of intellectual property managers.	University of Lethbridge	$462,000	$216,000	Other/ Multi-discipline
02-016	Microprocessing Facility	Micro-processing facility for applied research in agri-food products. R&D facility for applied agriculture, biotechnology, nutraceutical and functional food industries, training industry, college and university students.	Olds College	$3,963,006	$250,000	Life Sciences
02-017	Advanced technology network for animal behaviour/feed efficiency	To formalize a network of researchers and industry currently involved in the study of animal behavior and net feed efficiency to increase production, reduce environmental impacts of livestock and improve animal welfare.	University of Calgary	$2,479,000	$300,000	Life Sciences
02-022	A Video Streaming Platform for Wireless Applications	A new video streaming platform that prototypes an innovative video coding framework for wireless applications, which includes wireless video surveillance, wireless video conferencing and wireless distance learning applications with GPS capabilities.	University of Calgary	$471,000	$175,000	ICT
02-027	Prototyping Advanced Collaborative Environments (PACE) (From NETERA)	Pace integrates existing commercial video conferencing products with collaborative technologies just now coming out of the research lab, and creates a new set of integrated tools particularly suited for new	University of Calgary	$1,239,231	$250,000	ICT

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-032	Prototyping a Novel Insturment Combining Fluorescent Microscopy	A novel instrument to enable study of surface active agents simultaneously from a macroscopic and microscopic points of view. The instrument will further understanding of biological systems such as lung surfactants and devise novel drug delivery approaches.	University of Alberta	$355,600	$100,000	Life Sciences
02-034	Super High Resolution 3D Imaging and Visualization for Medical Diagnostics	This project is aimed at contributing to easing the healthcare crisis by developing and installing new diagnostic technologies combining high resolution and 3D medical imaging with efficient delivery of these media over the internet.	University of Alberta	$1,814,984	$500,000	Life Sciences
02-036	Development of a Collaboratorium to Enable the Transfer of Space Weather Research and Information	This initiative will result in the development of "Collaboratorium Infrastructure" intended to provide access to real-time (inter)national Space Weather data and models.	University of Alberta	$624,065	$225,000	Other/ Multi-discipline
				$23,626,079	$5,205,100	

APPENDIX 2
Projects Approved Between 1997 – 2000
INTELLECTUAL INFRASTRUCTURE PARTNERSHIP PROGRAM
PROJECT LIST: 1997-1998

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	IIPP Funding Approved	Key Strategic Area
300-10-1-1	National Biomolecular Very High Field Nuclear Magnetic Resonance (NMR) Facility (NANUC)	The advanced high field NMR is used in leading edge research in structural biology and contributes to knowledge in the chemical, pharmaceutical, medical and environmental sciences. It will lead to advances in medicine such as the design of new drugs for the treatment of cancer and heart disease, and in industry, providing the most sophisticated analysis of industrial products and materials	University of Alberta	$5,100,000	$1,000,000	Biotech
300-10-1-2	Multimedia Advanced Computational Infrastructure (MACI-1)	It will support high quality research in the sciences, engineering, medicine and the arts. Advanced research relies upon access to high speed multi-media computing. The project entails the purchase and installation of high performance computing equipment at both the U of A and the U of C as well as the provision of high speed interconnection networks.	University of Alberta University of Calgary	$1,920,000	$800,000	ICT
300-10-1-3	Lab for Laser Applications in Natural Resource Industries	The equipment consists of a state-of-the-art laser and detector systems. The main thrust of the research program will be to investigate and develop laser and spectroscopic-based techniques for the identification, measurement and characterization of materials of importance for the oil, mining and forestry industries.	University of Alberta	$866,818	$345,909	Energy
300-10-1-4	Confocal Microscope for Experimental Oncology Cellular Imaging Facility	The confocal microscope provides the means to develop three-dimensional images and to view changes in living tissue over time. The microscope will allow researchers to study cancerous cells and learn how they function differently from normal cells, and how their growth and multiplication can be more readily controlled.	University of Alberta Cross Cancer Institute	$962,150	$466,050	Health
300-10-2-2	Enhanced Bio-NMR Facility, High Field Solid State Nuclear Resonance Facility	Magnetic Resonance Spectroscopy provides information on the chemical and three-dimensional structure of molecules. It allows researchers to study proteins, carbohydrates and nucleic acids. An understanding of the function of these bio-molecules provides the necessary background knowledge that contributes to development of new drugs and treatments in medicine, to improved products in agriculture, and to a cleaner environment.	University of Calgary	$1,850,000	$500,000	Biotech.
300-10-2-3	Provincial Centres of Health/Biomedical Research and Training	These state-of-the-art laboratories, specialized containment rooms and related spaces will strengthen Alberta's biomedical research base by facilitating an increase in the development of new biomedical and health research programs that will build on the Faculty of Medicine's strengths in molecular medicine and health outcomes research.	University of Calgary	$4,200,000	$500,000	Biotech.
300-10-2-4	Level 3 Containment Facility	The Level 3 facility will significantly enhance Alberta's research capabilities with specific Level 3 pathogens and it will provide an opportunity for Alberta scientists to participate in the development of new generation vaccines.	University of Calgary	$1,920,000	$280,000	Health
		Totals:		**$16,818,968**	**$3,891,959**	

INTELLECTUAL INFRASTRUCTURE PARTNERSHIP PROGRAM
PROJECT LIST: 1998-1999

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	IIPP Funding Approved	Key Strategic Area
300-10-1-6	Computing Science Research Laboratory and Space	It will house: research labs in eight key areas of computer science research; space for faculty, graduate students, research associates and support staff; lab and office space for the Research Institute in Multimedia Systems; and space for collaborative research projects with industry partners. It will enable the department to consolidate in a single location and create a collaborative environment.	University of Alberta	$7,008,000	$1,600,000	ICT
300-10-1-8	Modern Infrastructure for Advanced Capabilities in Molecular Biology and Biotechnology	The project is to upgrade existing infrastructure, improve access to facilities that are in heavy demand, and provide new capabilities that are not currently available in the Department of Biological Sciences.	University of Alberta	$3,636,387	$1,305,690	Biotech.
300-10-1-10	Electrical and Computer Engineering Research Facility (ECERF)	ECERF will be constructed to accommodate a major expansion of the University's research activities in several areas of electrical and computer engineering. It will encompass aspects of information technologies, telecommunications, computer software engineering, advanced laser applications, microelectronics and microfabrication.	University of Alberta	$10,500,000	$4,200,000	ICT
300-10-1-11	Institute of Biomolecular Design (IBD)	To establish an interdisciplinary collaborative effort by combining the research areas of bio-organic chemistry, structural biochemistry, molecular biology, and pharmaceutical sciences. IBD's central research focus is Project CyberCell.	University of Alberta	$19,872,956	$3,900,000	Biotech.
300-10-1-12	Food for Health Innovations	A major collaborative program involving the U of A, U of C, AAFRD, AAFC and industry. The request is to support infrastructure in four key strategic areas: human nutrition; agri-food processing research; dairy, poultry, beef and swine research; and molecular biology.	University of Alberta	$7,348,000	$2,939,000	Health
300-10-1-13	Multimedia Advanced Computational Infrastructure - Phase II (MACI-2)	MACI-2 is phase two of a collaborative project between the universities of Alberta, Calgary, and Lethbridge. It will provide an set of shared computational, multimedia and broadband network resources to support private sector, university, and government researchers throughout Alberta.	University of Alberta University of Calgary	$16,040,000	$4,360,000	ICT
300-10-1-16	Geotechnical and Geoenvironmental Cold Regions Research Facility	The facility will be used to prevent future environmental pollution and to improve the existing environment by studying the characteristics and mirgration processes of hydrocarbon and other contaminents under adverse conditions. It will also be used to examine ways to protect the municipal infrastructure such as roads and buried services from the adverse climatic effects.	University of Alberta	$625,000	$250,000	Energy
300-10-1-17	Confocal/Multiphoton Imaging Facility	Multiphoton imaging can be used to follow the dynamic processes of living cells and to obtain information about the cellular processes at the molecular level. The research supported by the infrastructure will make significant contributions to knowledge of cellular, molecular and developmental biology, as well as an understanding of the molecular mechanisms of disease, develop new methods for diagnosing and treating human diseases.	University of Alberta	$976,181	$341,663	Health
300-10-2-6	Calgary Centre for Innovative Technology	To construct and equip a new wing to the Engineering Building to house six common and eig specialized labs. The objective of the CCIT propos is to focus the resources of the Faculty to support strategic research programs with strong links to industry and build critical mass in areas of existing strength.	University of Calgary	$35,099,204	$13,862,700	Energy

300-10-2-8	Electron Beam Facility for High Resolution Imaging and Micro-Analysis	These instrument will be used in a large variety of disciplines in the study of alloys, polymer studies, mechanical and chemical properties of thin films, physical and chemical properties of nanostructures, high resolution determination of biological macromolecular complexes, and studies to determine the localization of particular molecules in cells and tissues.	University of Calgary	$2,030,000	$800,000	Biotech.
300-10-2-9	Two-Photon Laser Scanning Confocal Microscope	This instrument will have a long lasting impact in research that is investigating the mechanisms by which activity in the brain and the heart are regulated. They will discover basic mechanisms in the prevention of blindness and poor eyesight. Finally this infrastructure will be an important tool to discover what controls the abnormal growth of cancer and the normal well regulated growth of developing embryos.	University of Calgary	$601,444	$177,200	Health
300-10-2-10	Electron Probe Microanalyzer	Purchase electron probe microanalyzer (EPMA) to replace an obsolete machine. Instrument is essential for materials research.	University of Calgary	$1,196,000	$478,000	Energy
300-10-2-11	Assessment of Major Biogeochemical Cycles using Stable Isotope Techniques	By using characteristic chemical "finger-prints" - so-called stable isotope ratios - the team will elucidate the fate of industrial sulfur emissions from sour gas processing plants in Western Canada and the fate of carbon dioxide emissions resulting from the utilization of fossil fuels. Also, the consequences of the use of nitrogen-containing fertilizers and manure by the agricultural industry on the water quality in rivers and groundwater will be investigated.	University of Calgary	$497,000	$199,000	Energy
300-10-2-12	Collaborative Earth and Environmental Science Research Initiative	Facilitate research into the complex relationships between earth and human systems. These problems include ground water supply and quality, ecosystem protection and management, the impact of climate change, and the assessment of human adaptation to environmental change. The research is based on newly emerging tools of geographic information systems (GIS), remote sensing, geophysical imaging and remote environmental monitoring.	University of Calgary	$500,000	$200,000	Climate /Environ.
300-10-3-2	Science Annex: Agricultural Biotechnology & Water Resources	A laboratory to house infrastructure for research on agricultural biotechnology with specific topics of strategic importance to the University, namely plant biotechnology and water resources. The building will house a phytotron (facility for growing plants in controlled enviroments) and greenhouses, together with a space for sample preparation and analysis, an equipment room for shared equipment and a number of laboratories.	University of Lethbridge	$2,653,044	$1,544,000	Biotech.
300-10-1-18	Ultrahigh Vacuum Surface Analysis Facility	Equipment to analyze the surfaces of materials for chemical composition, structure, electronic properties, and function under conditions of ultra-high vacuum and varying temperature. The infrastructure will support research in several areas of interfacial phenomenon including catalytic reaction engineering, materials wear and corrosion, and mineral and oil sands extraction and processing.	University of Alberta	$1,760,000	$704,000	Energy
	Total:			**$110,343,216**	**$36,861,253**	

INTELLECTUAL INFRASTRUCTURE PARTNERSHIP PROGRAM
PROJECT LIST: 1999-2000

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	IIPP Funding Approved	Key Strategic Area
300-10-1-27	Innovative Instrumentation for Advanced Proteome *Research*	Equipment to develop new technologies for proteome research	University of Alberta	$1,440,115	$576,000	Biotech.
300-10-2-16	Multi-Sensor Lab for Real-Time Positioning and GIS Applications	Equipment to establish a multi-sensor laboratory in the department of Geomatics Engineering	University of Calgary	$1,995,000	$664,000	Energy
300-10-1-23	Nuclear Magnetic Resonance for New Catalysts, Drugs and Materials	To expand the high resolution NMR facility for teaching with 'hands on operation' by as many students as possible. The Department of Chemistry and its Organic and Inorganic Faculty are the primary users of this infrastructure.	University of Alberta	$750,000	$260,000	Biotech.
300-10-1-24	Image-Guided Adaptive Radiotherapy (IGAR)	Equipment for state-of-the-art clinical research in oncology and medical physics	University of Alberta	$2,400,000	$957,000	Biotech.
300-10-3-4	NeuroScience Building	Construction and equipping of new building to accommodate neuroscientific and related research	University of Lethbridge	$8,596,984	$4,500,000	Biotech.
300-10-1-21	Canadian National Site Licensing Project	Funding to help purchase site licenses for electronic journals at Alberta universities' research libraries	Universities of Alberta; Calgary Lethbridge; & Athabasca	$5,388,800	$2,155,600	ICT
300-10-2-20	Protein Identification and Analysis by mass Spectrometry	Equipment for proteomics and related research	University of Calgary	$1,735,123	$788,123	Biotech.
300-10-2-23	Antennas for New Generations of Wireless Systems	Equipment to establish an integrated facility for the design, simulation, and measurement of advanced antennas	University of Calgary	$363,100	$137,300	ICT
300-10-2-26	Solid State Structure Determination by CCD Single Crystal X-Ray Diffractometer	Instrumentation for X-ray diffraction and structural characterization	University of Calgary	$443,000	$169,000	Biotech.
300-10-2-27	Laser Cooling and Imaging of Ions	Instrumentation for laser cooling and ion trapping	University of Calgary	$497,093	$199,000	Energy
300-10-2-18	Renovations and Expansion of the Life Science's Research Station	Construction and equipment for research conducted at animal care facility	University of Calgary	$11,800,000	$8,000,000	Biotech.
300-10-1-20	Food for Health Innovations Phase 2	Equipment and modernization of facilities for research into swine nutrition and reproduction, agri-food processing technologies, and human nutritional studies	University of Alberta	$6,560,000	$3,160,000	Agric.
300-10-2-24	Integrated Thermal Characterization	Equipment to comprise state-of-the-art thermal characterization facilities for analysis of materials	University of Calgary	$760,000	$190,000	Energy
300-10-2-29	Child Health Research Centre	Construction and equipping of a building for research and related activities	University of Calgary	$15,129,000	$690,000	Biotech.
300-10-1-25	Infrastructure for Research on Performance Assessment Structural Materials	Equipment and modernization of facilities for research into engineered materials and for full-scale structural testing	University of Alberta	$2,200,000	$ 845,300	Other
300-10-2-22	An Integrated System for Compound Identification and Analysis	Equipment for state-of-the-art compound-specific analysis isotope analysis	University of Calgary	$469,200	$187,450	Other
300-10-2-25	Rozsa Centre Multimedia Performance Gallery	Construction and equipping of a state-of-the-art facility for multimedia research and performance	University of Calgary	$1,600,000	$550,000	Other
	Totals:			**$62,127,415**	**$24,028,773**	

SCIENCE AND RESEARCH FUND
PROJECT LIST: 1997-1998

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	S&R Funding Approved	Key Strategic Area
01406-003-01	National Biomolecular Nuclear Magnetic Resonance (NMR) Facility (NANUC)	The advanced high field NMR is used in leading edge research in structural biology and contributes to knowledge in the chemical, pharmaceutical, medical and environmental sciences. It is expected that research results from this facility will lead to advances in medicine such as the design of new drugs for the treatment of cancer and heart disease, and in industry, providing the most sophisticated analysis of industrial products and materials.	University of Alberta	$5,352,000	$1,552,000	Biotech.
01406-003-02	PIMS: Mathematical Program for Industry and Education	PIMS is dedicated to promoting all aspects of the mathematical sciences by stimulating, coordinating and facilitating the activities of the mathematical scientists in Alberta and BC by linking them more closely with those in industry, business, government sectors, and mathematical scientists in the rest of the world. Disciplines include pure and applied mathematics, statistics, computer science, physical, chemical and life sciences, medical science, finance, management, and several engineering fields.	University of Alberta	$1,485,000	$110,000	Other
01406-003-03	Level 3 Containment Facility	The Level 3 facility will significantly enhance Alberta's research capabilities with specific Level 3 pathogens and it will provide an opportunity for Alberta scientists to participate in the development of new generation vaccines.	University of Calgary	$2,320,000	$420,000	Health
01406-003-04	Advanced Internet in Alberta: Expansion and Enhancement (NETERA)	The project's objective is to provide Alberta with a world class "next-generation" Internet research network to foster the development of a knowledge based economy and to attract highly skilled persons to new jobs in key application areas: health, education, telecommunications, earth resources and entertainment.	University of Calgary	$5,700,000	$1,112,000	ICT
01406-004-05	Enhanced Bio-NMR Facility, High Field Solid State Nuclear Resonance Facility	Magnetic Resonance Spectroscopy will allow researchers to study proteins, carbohydrates and nucleic acids. This infrastructure will enable a research team to study non-soluble proteins with potential applications to the agriculture, medical and oil and gas sectors.	University of Calgary	$3,365,178	$150,000	Biotech.
		Totals		**$18,222,178**	**$3,344,000**	

SCIENCE AND RESEARCH FUND
PROJECT LIST: 1998-1999

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	S&R Funding Approved	Key Strategic Area
01406-004-03	Microfabrication and Characterization Facility	The technology involves highly miniaturized electrical and mechanical systems for automated chemical, biological and medical sensing, measurement and analysis. Microfabricated devises and materials are expected to have an enormous impact on society in the next century and afford tremendous commercial opportunities.	University of Alberta	$6,000,000	$1,890,000	Energy
01406-004-13	Laboratory for Laser and Spectroscopic Applications in the Natural Resource Industries	The equipment consists of a state-of-the-art laser and detector systems. To investigate and develop laser and spectroscopic-based techniques for the identification, measurement and characterization of materials of importance for the oil, mining and forestry industries.	University of Alberta	$2,676,000	$346,000	Energy
01406-004-14	Research Infrastructure for the Electrical and Computer Engineering Research Facility (ECERF).	Computer Communications and Infrastructure for ECERF; Clean Room Facilities for the Nanotechnology and Microdevices Group; & Research infrastructure for the Communications Laboratories.	University of Alberta	$12,400,000	$1,918,000	ICT
01406-004-18	PIMS: Mathematical Programs for Industry and Education	Disciplines include pure and applied mathematics, statistics, computer science, physical, chemical and life sciences, medical science, finance, management, and several engineering fields. Development of industrial contacts leading to effective collaboration between academic researchers and their counterparts in industry to solve applied problems of commercial importance.	University of Alberta University of Calgary	$7,920,000	$800,000	Other
01406-004-19	Research Chairs Program in Biofilms, Biomaterials and Biomechanics	Expertise in Biofilm research at the U of C (Faculties of Medicine, Engineering and Science) will be solidified by the formation of the two Chairs in Biofilm Research. The Chairs will work together with Alberta industry to produce processes and products to control biofilms that can be ultimately commercialized.	University of Alberta University of Calgary	$6,000,000	$2,000,000	Biotech.
01406-004-05	Enhanced Bio-NMR Facility, High Field Solid State Nuclear Resonance Facility	Equipment will allow researchers to study proteins, carbohydrates and nucleic acids. An understanding of the function of these bio-molecules provides the necessary background knowledge that ultimately contributes to developments of new drugs and treatments in medicine, to improved products in agriculture, and to a cleaner environment.	University of Calgary	$1,475,000	$350,000	Biotech.
01406-004-15	Centre for Transportation Engineering & Planning	Will provide technology transfer services and research facilitation for Alberta institutions and corporations involved in transportation engineering and planning. The Centre serves the research and technology transfer needs by acting as a central clearinghouse/coordinating body for information and research needs relevant to its members.	University of Calgary	$1,832,000	$600,000	Other
01406-004-16	Electron Beam Facility for High Resolution Imaging and Microanalysis	Instrument to study of alloys, polymer studies, mechanical and chemical properties of thin films, physical and chemical properties of nanostructures, high resolution determination of biological macromolecular complexes, and studies to determine the localization of particular molecules in cells and tissues	University of Calgary	$2,000,000	$100,000	Biotech.
01406-004-12	Pharmaeconomics and Health Outcomes	To advance the Institute for Pharmaco-Economics from its current position into a centre of excellence. Pharmacoeconomics is the evaluation of the costs and benefits of drug products and policies from the multiple perspectives of patients, drug insurance companies, health care providers, provincial or regional health bodies and society at large.	Institute of Pharmo-Economics	$1,652,000	$375,000	Health

01406-004-02	Global Communications Centre	The Centre will add value to education and to Industries both locally and provincially. The centre will enhance SAIT's reputation and influence in applied research with a resulting positive, economic and social impact.	Southern Alberta Institute of Tech.	$25,500,000	$3,500,000	ICT
01406-004-11	Technology and Incubation Services	Technology commercialization and incubation services including specialty interior infrastructure such as: laboratories; smart (wired) offices with high speed communications systems; prototype manufacturing environment; and a networking areas to facilitate advanced technology company creation and growth.	Calgary Research and Development Authority	$7,022,000	$1,500,000	Tech. Comm.
01406-004-07	Monitoring Forest Biodiversity	To build a comprehensive, long-term monitoring program that will measure success towards the goal of sustainable development in Alberta's forests. Such a program would confer strategic advantages to the forestry and energy sectors, and would contribute to the reporting mandate of National Parks and other protected areas.	Foothills Model Forest	$540,400	$150,000	Energy Forestry
01406-004-04	Burned Wood Processing	To determine the effect of moderate and severely fire damaged wood and harvesting delays on the quality of pulp produced by kraft, thermo-mechanical, and pressurized chemithermo-mechanical pulping processes. To determine the technical and economical feasibility of recovering fibre from moderate and severely damaged wood using current equipment.	Mechanical Pulping Consortium	$1,575,000	$345,000	Agricultur / Forestry
01406-004-17	Byproducts Synergy	A practical application of industrial ecology in which companies work together in a given region to match feedstock needs to by-products. Through the BPS process, individual companies are transformed into a cross-industry team focused on turning every gram of material running through their plants into product.	International Institute for Sustainable Development	$300,000	$40,000	Other
01406-004-09	Canada-Wide Science Fair	The national level of competition for students interested in pursuing an interest in science that extends beyond the classroom (Project-based Science). This event has been held annually since 1961 and a bidding process must be followed by any local organization interested in hosting a CWSF.	Edmonton Host Committee	$549,000	$44,000	Science Awarenes
01406-004-10	NetWorks: Understanding Telecom	To provide teachers and their students, librarians and community group leaders access to the pool of scientific and technological expertise in telecommunications and foster science and technology as areas of interest and create an interest in these areas as potential career choices.	Science Alberta Foundation	$580,000	$75,000	Science Awarenes
01406-004-08	Enhanced Science and Technology Hotlines	To connect Volunteer scientists, technologists, engineers and mathematicians with teachers, students (grades K-12) and the public to develop and promote scientific and technological literacy by increasing their knowledge and enthusiasm.	Science Alberta Foundation	$244,280	$198,500	Science Awarenes
01406-004-01	Feasibility Study for the Creation of a Bioscience Technology Development	Study the concept for a Biotech Centre in Edmonton. Construction of a new technology infrastructure in Alberta will support the development of emerging companies with biotechnology products for the health, agriculture and environment sectors.	Economic Development Edmonton	$120,000	$90,000	Science Awarenes
01406-004-06	BioAlberta	Connect the biotechnology community to work together towards the benefit of the overall industry. As the provider of valuable marketing, networking, education, and information services, BioAlberta actively contributes to the success of individual companies and, ultimately, to the growth of the Alberta biotechnology industry as a whole.	Alberta Biotechnology Association	$700,000	$300,000	Biotech.
	Totals:			**$79,085,680**	**$14,621,500**	

SCIENCE AND RESEARCH FUND
PROJECT LIST: 1999-2000

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	S&R Funding Approved	Key Strategic Area
99-03	Assessing Fluid Flow Characteristics in Bioturbated Media	A research program focusing on burrow related dolomotization and it's impact on resevoir quality, fluid flow, and well log analysis. The applications of this research allow measurement of the fluid flow characteristics of a newly discovered oil bearing reservoir and will also aid in secondary crude oil recovery techniques.	University of Alberta	$190,000	$125,000	Energy
99-10	Flow Cytometer for Detection and Evaluation of Disinfection of Human Protozoa, Giardia and Cryptosporidium in Drinking Water	To assess the viability of the population of parasites using fluorescence activated cell sorter aided analyses and develop standardized methodology for use by the water industry.	University of Alberta	$646,000	$131,000	Health
99-14	U of A Research Transition Facility	The University will convert existing building space to provide synergistic, clustered services on campus to support the creation and early-stage growth of spin-off or associated companies.	University of Alberta	$3,572,000	$1,500,000	Tech. Com.
99-15	Sources, Deposition and Bioaccumulation of Mercury in Alberta	Project will establish a well-equipped mercury clean-room facility to evaluate regional and long-range sources, biogeochemical pathways and potential biological effects of mercury on lakes in Alberta	University of Alberta	$610,000	$305,000	Health
99-16	Equipment Infrastructure for Olefin Polymerization Laboratory	Acquisition of this equipment will create a state-of-the-art laboratory for catalysis, with unique capabilities. Will interface directly with industry and chemical engineering.	University of Alberta	$546,237	$91,500	Tech. Com.
99-17	Development of a Wear/Surface Protection Program	Will provide equipment (triboscope and scanning Kelvin probe) and conduct research relevant to industry	University of Alberta	$1,225,000	$499,800	Energy
99-19	Biotechnology Training Centre	A facility to instruct students in state of the art techniques in biotechnology including molecular biology, microbiology, molecular diagnostics, protein biochemistry, electrophysiology and cell injection technology. A computer instruction lab will be used for instruction in molecular genomics, proteomics, bioinformatics and molecular modeling.	University of Calgary	$853,000	$493,000	Biotech
99-23	Canadian Process Tomography Consortium	Requested funds include upgrading and purchase of equipment, and maintenance. Lab will support research in energy, chemical, environment, and medical sectors.	University of Calgary	$3,190,000	$435,000	Energy
99-27	Translational Molecular Biology Research in Breast Cancer	Objectives include creation of a clinical/ pathologic/ outcome data base of breast cancer patients, technical infrastructure, and establish an applied molecular biology research partnership.	University of Calgary	$1,832,000	$525,000	Health
99-29	Infrastructure for Shallow Geophysical Studies	Will provide infrastructure equipment, such as ground penetrating radar, distributed seismic data acquisiton system to develop a field data acquisition system .	University of Alberta	$1,836,000	$776,000	Energy
99-59	A Diode Laser Based Gas Sensor for Environmental Monitoring	Will establish a research program to explore potential of mid-infrared diode laser spectrometer for use in real time trace-gas monitoring applications.	University of Alberta	$264,500	$58,500	Health
99-60	Development of the Alberta Plant Diversity and Conservation Centre	Primary method of assessing environmentally sound development is through assessing biodiversity. Goal is to integrate all plant occurrence knowledge and research into one centre to provide information services for all of Alberta.	University of Alberta/ Devonian Bot. Garden	$3,291,000	$100,000	Agric.
99-13	Research Infrastructure for Experimental Computing	Infrastructure to enhance the core research activities of artificial intelligence and cognitive science, database management, software engineering, communications and networks, graphics and multimedia, algorithmic, vision and robotics, and parallel and distributed computing.	University of Alberta	$2,742,000	$1,322,500	ICT

99-22	Alberta Advanced Networking Infrastructure 2002	The AANI 2002 project will extend and enhance Alberta's existing research network, Wnet, connect existing computational resources, and expand programs in training, outreach, technical support.	Netera Alliance	$27,200,000	$1,800,000	ICT
99-30	Alberta Software Engineering Research Consortium	Goals of ASERC are to foster collaborative research amongst Alberta's strong and emerging software industry, through collaborative research projects, joint workshops and software quality assessments. Four distinct areas are outlined and realistic solutions are proposed.	University of Alberta/ University of Calgary	$5,517,000	$1,800,000	ICT
99-38	Atom Manipulation Facility	The objective is to study unique arrangements of solid matter. The project will help to elucidate the fundamental properties of matter on nanometre length scales and will help in the quest to further miniatureize and accelerate devices used in information technology.	University of Alberta	$1,886,000	$425,000	ICT
99-41	The New Media Institute Human Centered Interface Design project	The key goal of this project is to accelerate research at The Banff Centre for the Arts in next generation new media. The Human Centered Interface project will significantly build the growth capabilities of the multimedia industry in Alberta.	Banff Centre	$7,717,500	$600,000	ICT
99-58	Polymeric Organic Materials for Applications in Information and Communications Technology	The project integrates all aspects of synthesis and evaluation of polymeric organic electro-optic and nonlininear optical (NLO) materials and targets the incorporation of suitable polymers into photonic devices that are essential to emerging telecommunications technology.	University of Alberta	$1,367,000	$259,000	ICT
99-09	Alberta Science Literacy Association Science Education Outreach Project	To provide teachers and their students, librarians and community group leaders access to the pool of scientific and technological expertise available in Alberta by connecting them directly with scientists, technologists, engineers and mathematicians.	Alberta Science Literacy Assn/Science Alberta Foundation	$4,134,000	$270,000	Science Awarenes
99-48	Constructing Knowledge Communities in Face-to-Face and Virtual Environments	The project plan involves a partnership with government, industry and post-secondary institutions to develop an innovative model of teacher development that will develop a province-wide network of school-based Centres of Excellence in technology integration; contribute to educational research into technology integration.	The Galileo Educational Network Association (at UofC)	$4,945,000	$600,000	Science Awarenes
99-65	Scientist 2010 Computers	Computers and related software for longitudinal study on computer use by students.	Edmonton Space & Science Centre	$3,500,000	$100,000	Science Awarenes
99-01A	Alberta Cancer Board Medical Cyclotron Facility	The facility will promote clinical and basic research into development of new imaging radiopharmaceuticals, facilitate basic research into physiology of disease, provide routine imaging, and function as a high-technology.	Alberta Cancer Board/ University of Alberta	$6,654,800	$2,200,000	Health
99-02A	Centre for the NMR Evaluation of Human Function and Disease	This project investigates by means of nuclear magnetic resonance the functioning of the normal human body and changes brought about by disease, disorders and injuries.	University of Alberta	$12,355,730	$4,382,000	Health
99-03A	Nutraceutical Treatment of Mental Disorders	To Evaluate the effectiveness of a nutrient supplement for symptom relief in mental illness.	University of Calgary	$926,957	$588,757	Health
99-04A	Electron Probe Microanalyzer	An EPMA is used for non-destructive chemical and image analysis of small selected areas of virtually any solid material, natural or synthetic. It is increasingly recognized as a base level instrument for modern geochemical and materials science research.	University of Calgary	$1,611,000	$180,000	Energy
99-05A	Flaring Technology Research Program	This flaring research program is being conducted within an overall strategy of minimizing both flaring and the release of harmful products of incomplete combustion to the atmosphere.	Canadian Association of Petroleum Producers	$373,000	$373,000	Energy

99-06	Carbon Dioxide Sequestration in Geological Media in Alberta	Project aims to identify, characterize and establish on a local scale the CO2 capacity of specific geoligical sites in the vicinity of major power, cement, petrochemical, oil sands and gas plants in Alberta.	Alberta Energy and Utilities Board	$800,000	$240,000	Energy
99-11	Information-Based Decision Support Systems for Process Industries	An intergrated, information-based decision support system that will solve applications-driven problems in real time. The IBDS Systems will monitor large volumes of data, extract the information to predict and identify potential problems, and make decisions about action to be taken to avoid equipment failures, process shutdowns, product-quality, environmental violations, etc.	University of Alberta	$925,000	$925,000	ICT
99-12A	Glaxo Wellcome - Virology Chair	Support for a Chair in viral pathogenesis at the University of Alberta Faculty of Medicine and Dentistry.	University of Alberta	$1,250,000	$1,250,000	Health
99-18	Sustainable Development of Coalbed Methane: Phase IIIA	Phase III consists of two parts: A) efficient surface facility designs both at a commercial and pilot scale and testing a synthetic 'flue gas' composition in a micro-pilot (single well test) in a new well to be drilled; B) optimum strategy for full-scale pilot will be finalized.	Alberta Research Council Inc	$2,800,000	$1,500,000	Energy
99-26	Fundamental Geomechanics for Geological Sequestration of Greenhouse Gasses	Project will 1) develop experimental infrastructure to assess geological formations; 2) conduct experimental program on sequestration in coalbed methane resevoirs; 3) integrate geomechanical models into numerical simulation software.	University of Alberta	$821,000	$627,000	Energy
01406-006-04	Institute for Health Economics (Development of Excellence in integrated research)	An Alberta wide initiative to foster growth and academic capacity in health economics and health outcomes research and education.	Institute of Health Economics	$1,325,000	$1,325,000	Health
	Totals:			**$106,906,724**	**$25,807,057**	